

TECHNICAL REPORT

NO. T97- 5

IZATION OF A THREE-PHASE RESPONSE IN COLD-STRESSED FINGERS

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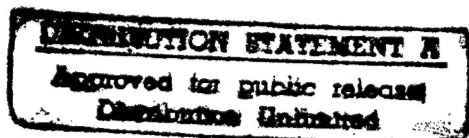
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DRAFT SF 298

1. Report Date (dd-mm-yy) March 1997		2. Report Type Technical Report		3. Dates covered (from... to)	
4. Title & subtitle Characterization of a Three-Phase Response in Cold-Stressed Fingers				5a. Contract or Grant #	
				5b. Program Element #	
6. Author(s) Avraham Shitzer, Thomas L. Endrusick, Leander A. Stroschein, Robert F. Wallace and Richard R. Gonzalez				5c. Project #	
				5d. Task #	
				5e. Work Unit #	
7. Performing Organization Name & Address U.S. Army Research Institute of Environmental Medicine Kansas Street Natick, MA 01760-5007				8. Performing Organization Report #	
9. Sponsoring/Monitoring Agency Name & Address U.S. Army Medical Research and Materiel Command Fort Detrick, MD 21702-5012				10. Monitor Acronym	
				11. Monitor Report #	
12. Distribution/Availability Statement Approved for public release; distribution unlimited					
13. Supplementary Notes					
14. Abstract Seven gloves were tested in 8 subjects (6 males and 2 females) in cold-dry, C-D, (db= -17.2°C; dp= -25.1°C), and cold-wet, C-W, (dp=0°C; dp= -8.4°C) conditions. Endurance times were 75 min (C-D) and 162 min (C-W). Females' endurance times were significantly (p<0.05) shorter at 47 and 127 min, respectively. A three-phase response pattern of the fingers was characterized. In Phase I finger-tip temperature remains close to the initial level, due to delayed vasoconstriction [durations:15 min (C-D), 43 min (C-W)]. In Phase II vasoconstriction causes an exponential-like decrease of finger temperature-tip [durations: 36 min (C-D), 62 min (C-W)]. Phase III manifests periodic finger temperature changes due to cold induced vasodilatation [CIVD; durations: 20 min (C-D), 58 min (C-W)]. Average wave patterns for Phase III showed 3½ waves/hr (C-D) and only about 2 waves/hr (C-W). Extension of endurance times due to CIVD, were 13 min in the C-D and 31 min in the C-W conditions. Three overall response patterns of fingers in the cold were characterized: 1) Type A exhibiting all 3 phases; 2) Type B1 or B2 exhibiting either Phases I+II or Phases II+III; and, 3) Type C showing only Phase II.					
15. Subject Terms Endurance times; cold environment; gloves; cold induced vasodilatation; gender differences					
DTIC QUALITY INSPECTED 2					
Security Classification of			19. Limitation of Abstract	20. # of Pages	21. Responsible Person (Name and Telephone #)
16. Report Unclassified	17. Abstract Unclassified	18. This Page Unclassified			

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ACKNOWLEDGEMENTS

The authors wish to thank Mr. Julio A. Gonzalez and Ms. Mona Sharaf for their technical assistance. This work was done while the senior author was a National Research Council Senior Research Associate funded by Defense Women's Health Research Grant No. P633002.801. The authors express their sincere appreciation to Mrs. Diane M. Danielski for the excellent word-processing support.

EXECUTIVE SUMMARY

Gloved fingers were studied in 8 sedentary subjects (6 males and 2 females) exposed to cold-dry, C-D, ($\bar{T}_{db} = -17.2^{\circ}\text{C}$; $\bar{T}_{dp} = -25.1^{\circ}\text{C}$), and cold-wet, C-W, ($\bar{T}_{dp} = 0^{\circ}\text{C}$; $\bar{T}_{dp} = -8.4^{\circ}\text{C}$) conditions. The subjects wore extended cold weather clothing and each of 7 different gloves. Both middle fingers, body and skin temperatures were continuously recorded. Average endurance times were 75 min for the C-D and 162 for the C-W conditions. Females average endurance times were significantly ($p < 0.05$) shorter at 47 and 127 min, respectively. A three-phase response pattern of the fingers was characterized. Phase I, typical of gloved fingers, comprised an initial period during which finger temperature remains high and close to the pre-exposure level, due to delayed vasoconstriction in the finger. Average durations of Phase I were 15 min in the C-D and 43 min in the C-W conditions. Phase II involves an exponential-like decrease of finger temperature indicative of the onset of vasoconstriction in the finger. Average durations and exponential time constants were 36 min and 30 min for the C-D and 62 min and 51 min for the C-W conditions. Phase III manifests periodic finger temperature changes due to cold induced vasodilatation (CIVD). Average durations of Phase III were 20 min for the C-D and 58 min for the C-W conditions. Average wave patterns for this Phase were constructed indicating some $3\frac{1}{2}$ wave/hr in the C-D but only about 2 waves/hr in the C-W condition. Extension of endurance times, due to beneficial thermal effects of CIVD, were estimated at 13 min in the C-D and 31 min in the C-W conditions. Three overall behavioral patterns of fingers in the cold were characterized as suggested by these phases: 1) Type A exhibiting all 3 phases; 2) Type B₁ or B₂ exhibiting either Phases I+II or Phases II+III; and, 3) Type C showing only Phase II.

INTRODUCTION

Protection of body parts, and the hands in particular, is of primary concern in cold weather. This is typically done by the donning of either gloves or mittens. The effectiveness of these handwear items depends on their design and configuration and much work has been done in improving their performance (e.g., Herman et al., 1992). However, the principal natural factor in determining the time course of change of finger temperature is its blood supply; as long as it remains high, the finger is not deprived of its major heat source and its temperature does not drop to uncomfortably low levels (e.g., Shitzer et al., 1996). Thus, a conflict of tendencies is observed in a cold exposure since the body tends naturally to constrict the flow of warm blood to the extremities, thereby decreasing heat loss to the environment. This, in turn, will result in a rapid drop in finger temperature with the wind playing a significant role, even in the gloved finger, as was recently demonstrated by Shitzer et al. (1994).

The literature is replete with studies on the responses of bare (e.g., Elkington, 1968; Livingstone, 1976; Jaeger et al., 1978) or gloved (e.g., Santee et al., 1990) fingers in cold weather. In many of these studies finger temperature was monitored with particular emphasis on cold induced vasodilatation (CIVD) first described by Lewis (1930). Livingstone (1976) characterized changes in CIVD responses due to adaptation to a 2-week cold exposure in Canadian soldiers. He was concerned with three parameters: 1) temperature at first rise, 2) mean finger temperature over a 30 min period of exposure, and, 3) time of first rise. The first two parameters were found to decrease and the third to be delayed due to short-term adaptation. Werner (1977) studied the influences of local and global temperature stimuli on the Lewis-reaction. The study was concerned with the following parameters: 1) the number of periods of increasing/decreasing temperature cycles; 2) peak-to-peak amplitudes of oscillation, and, 3) mean levels of oscillation. Werner did not find evidence that the environmental conditions in his study affected the time course of change in finger temperature. The mean level of temperature oscillation was found to increase with the environmental temperature to which the body or the hand were exposed. The amplitude of oscillations increased with body exposure to higher environmental temperatures and decreased when the hand was exposed to lower environmental temperatures. Dannen and Hues (1995) recently characterized CIVD by the following parameters: Δt_{peak} - time from onset

of the first wave to the appearance of the peak in finger temperature; Δt_{period} - duration of the entire opening-closing sequence in finger blood flow; T_{max} and T_{min} - maximal and minimal temperatures of a complete CVD wave, and, ΔT_{peak} - the difference between these temperatures. They also defined Δt_{onset} similar to Livingstone's "time of first rise."

None of these studies attempted to characterize the complete response of fingers to cold. Rather, the attention was limited to the oscillatory phase of this response during which cold induced vasodilatation is much in evidence. Moreover, the various parameters studied left undefined effects mostly in the inter-relations between adjacent temperature change waves.

The objectives of this study are three-fold: (a) characterize a three-phase response pattern to describe the complete response of gloved fingers exposed to cold weather; (b) analyze the data to statistically quantify parameter values which characterize population responses in cold environments; and, (c) introduce the concept of exponential time constant for the fast finger temperature drop associated with its exposure to cold environmental conditions to facilitate the estimation of the thermal benefits due to CVD cycles vis-à-vis endurance extension times.

METHODS

Data from a previous study in this Laboratory (Endrusick et al., 1994) forms the database for the present analysis. Eight volunteers (6 males and 2 females) 19-35 yrs of age (average 24.6) participated in the experiments. The experiments were conducted during the morning hours in the climatic chambers at the US Army Soldiers Systems Command in Natick, MA. The volunteers were briefed on the purposes of the study and signed informed consents in accordance with regulations. In all experiments the subjects wore an extended cold weather clothing ensemble (thermal resistance of $0.56 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ and water vapor resistance of $0.082 \text{ m}^2 \cdot \text{kPa} \cdot \text{W}^{-1}$) and a pair of vapor-barrier boots (thermal resistance of $0.28 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$). Seven gloves were tested of which the standard US Army Men's and Women's Intermediate Cold-wet Glove (ICWG) served as control. The thermal resistance of fresh samples of the various gloves was measured on a copper hand ranging between 0.16 and $0.21 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ (average 0.184). Complete physical characteristics of the gloves are given in Endrusick et al. (1994). Rectal

temperature, a four-point mean-weighted skin temperature and 3 dorsal temperatures of the right and of the left middle fingers (base, middle phalange and tip) were continuously monitored by thermocouples and recorded at 1 minute intervals.

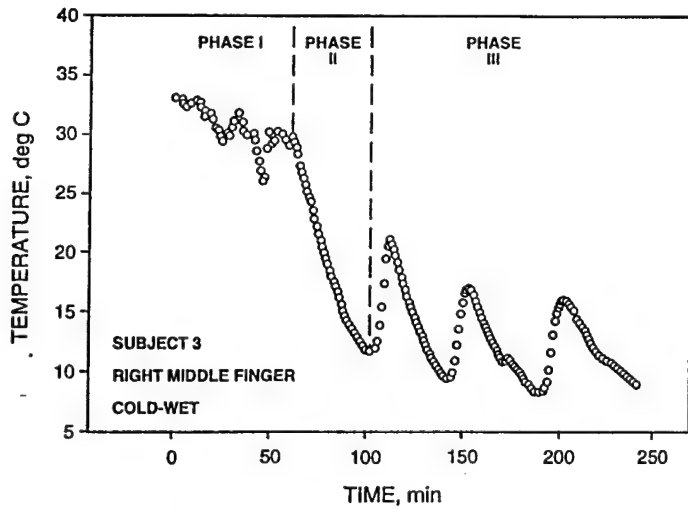
The subjects were tested in repeated, cross over design tests. Each subject wore each glove and was exposed to two different environmental conditions: cold-dry ($\bar{T}_{db} = -17.2^{\circ}\text{C}$; $\bar{T}_{dp} = -25.1^{\circ}\text{C}$), and cold-wet ($\bar{T}_{dp} = 0^{\circ}\text{C}$; $\bar{T}_{dp} = -8.4^{\circ}\text{C}$). In the latter series of tests the gloves were externally-wetted in a 1 hour immersion of all fingers and thumb in water prior to the experiments, hence the "wet" descriptor. Endurance times were measured for each of these gloves, defined as the total length of time an individual could endure either environmental exposure while wearing each glove, other conditions being equal. All experiments were planned for a total duration of 4 hours with possible earlier cutoffs at either any skin temperature reaching 5°C , the medical monitor's decision or the subject's wish to withdraw from the experiment. The range of average endurance times obtained for each of the gloves in the cold-dry condition was 67-82 min (mean 75) and for the cold-wet condition 137-186 min (mean 162).

The data were analyzed statistically by paired and independent t-tests. Analysis of the differences among the gloves showed that endurance times were not significantly different for either test conditions ($t=0.2765$ for the cold-dry and $t=0.9375$ for the cold-wet conditions). Therefore, in the following analysis of the data, results of all gloves were grouped together for each of the exposure conditions.

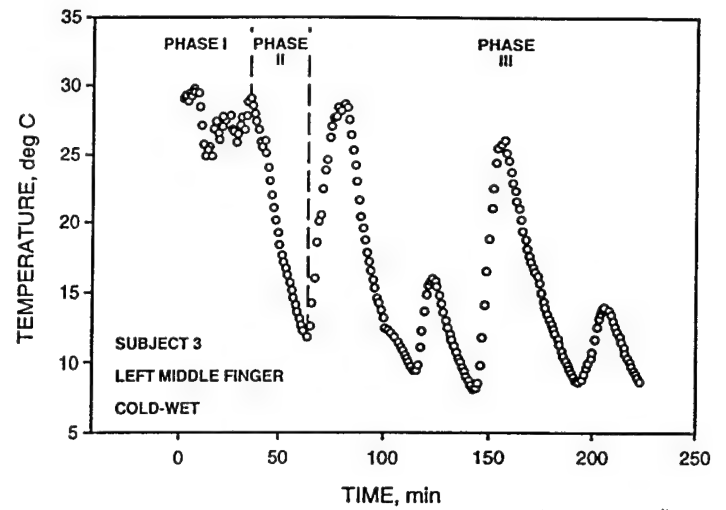
ANALYSIS

Consideration of the typical responses of fingers to cold exposure (see Appendix A) suggests that they might be described by combinations of the three interconnected phases as illustrated in Figs. 1-3:

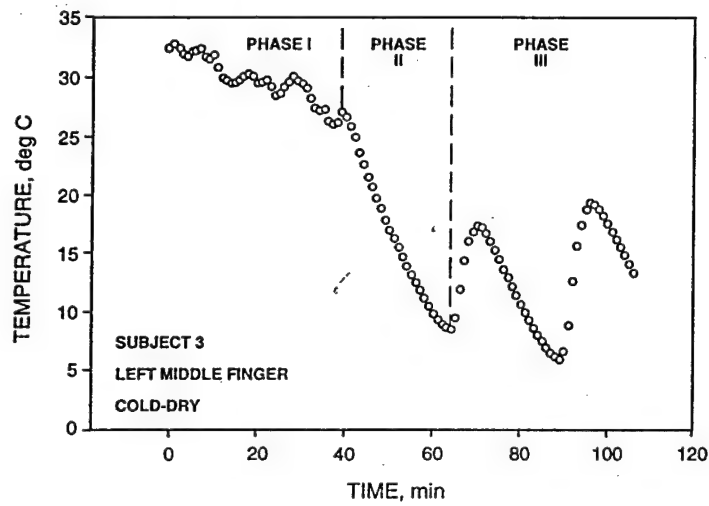
PHASE I: During this initial phase finger temperature remains high and close to the pre-exposure level, Figs. 1 and 2(a), which is quite typical to gloved fingers. This condition is mediated by the maintenance of a relatively high blood perfusion in the finger, close to basal level. A steady, but moderate,



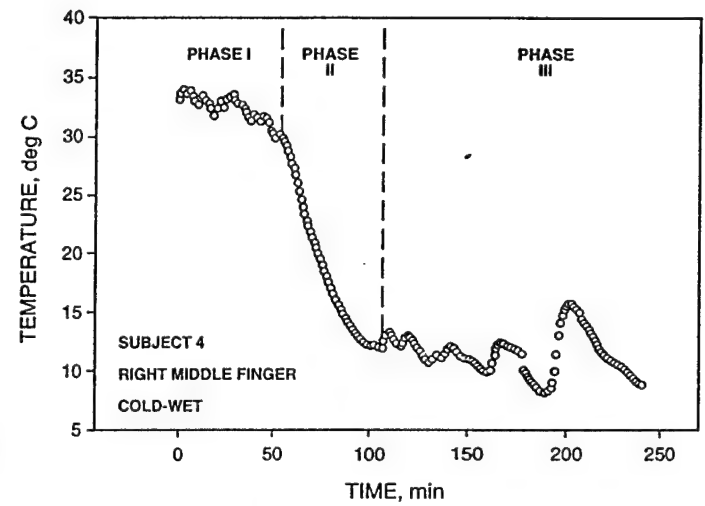
(e) decreasing waves



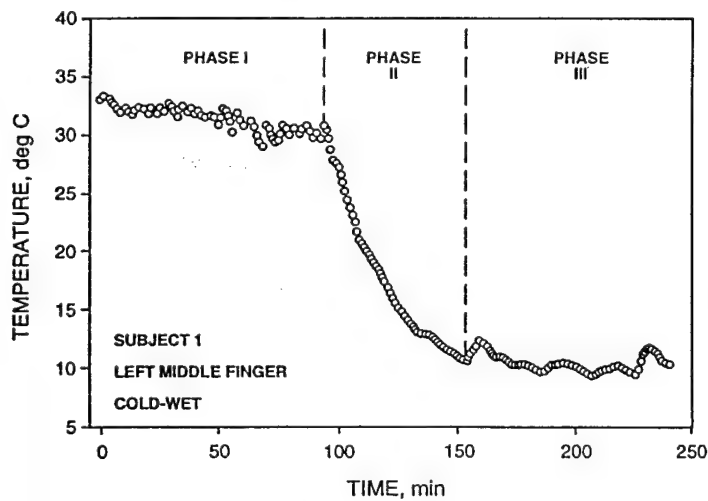
(f) alternating (variable) waves



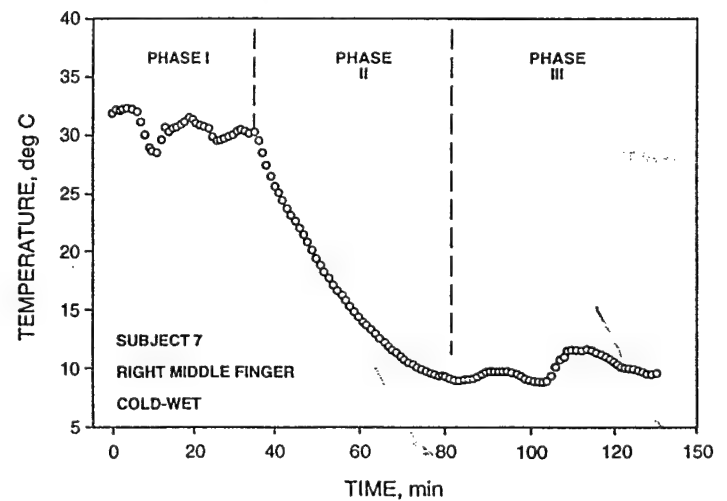
(c) large frequent waves



(d) increasing waves

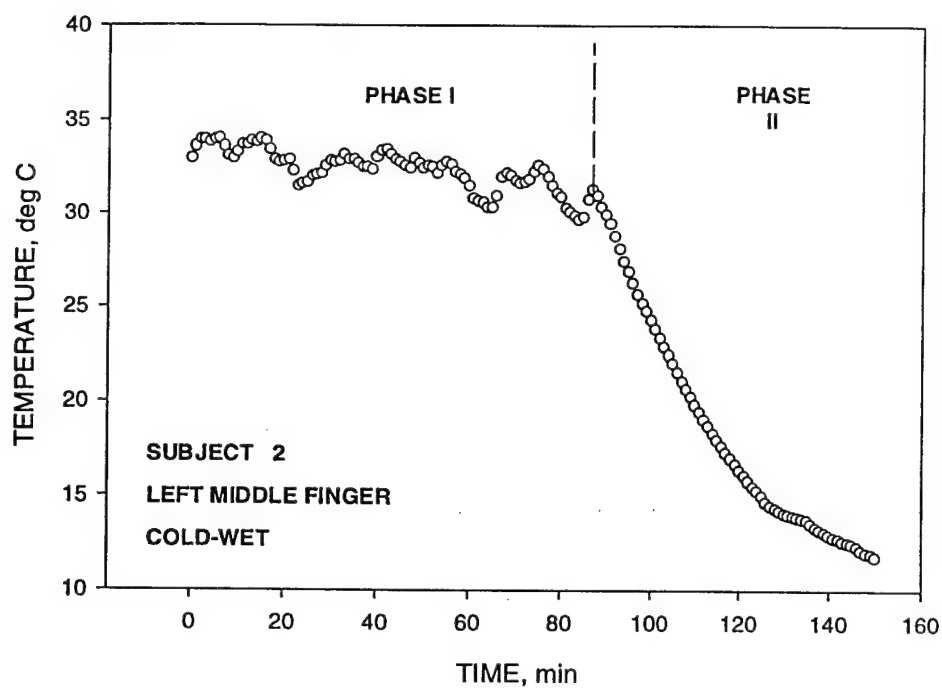


(a) small frequent waves

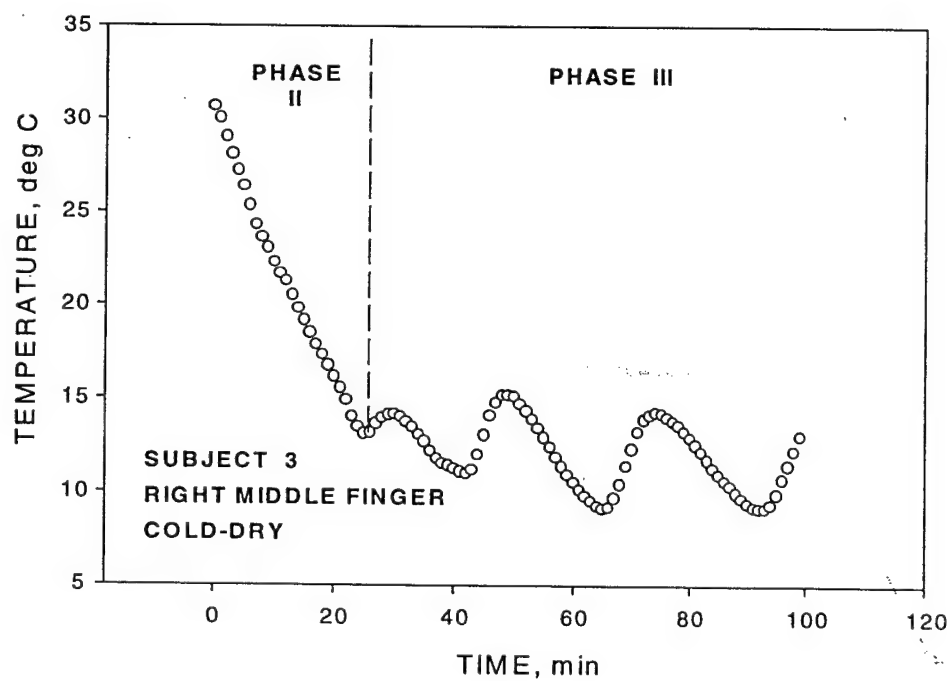


(b) intermediate frequent waves

Fig. 1: Type-A response.



(a) Type-B₁ response (phases I+II)



(b) Type-B₂ response (phases II+III)

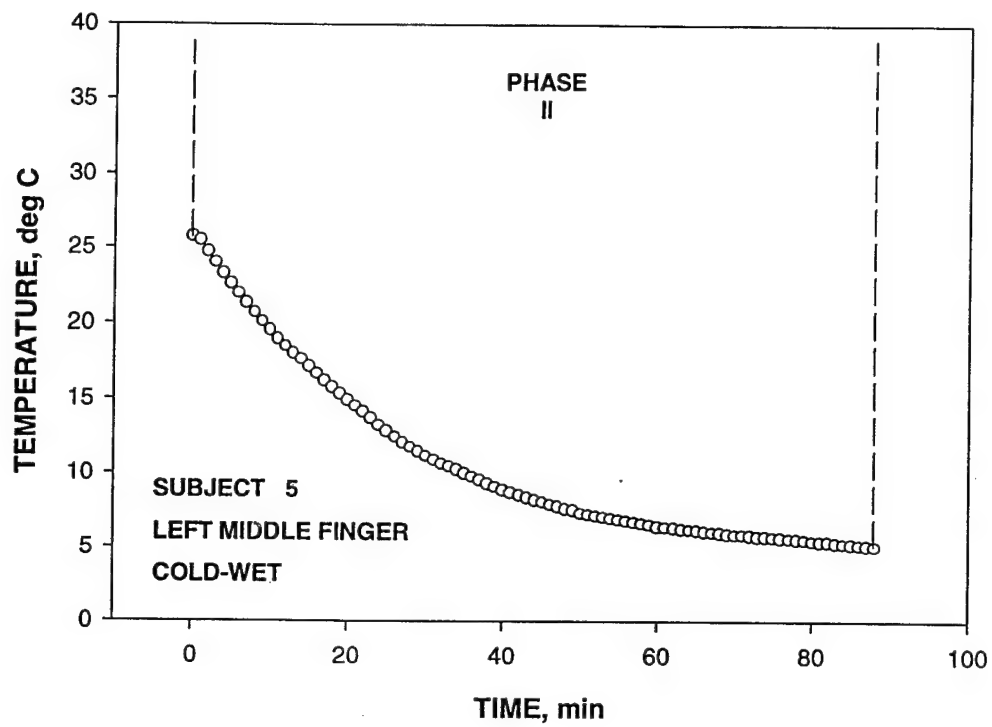
Fig. 2: Type-B responses.

temperature drop is usually noticeable, due to heat loss from the highly-perfused finger to the environment (Newtonian cooling). Superimposed are fluctuations (hunting) in finger temperature but, until vasoconstriction has set in, the general trend is maintained. Certain subjects may not be capable of exhibiting this *phase* which may also be precluded by certain environmental conditions. Table 1 summarizes the average initial temperatures, temperature drops and durations for all subjects in both the cold-dry and cold-wet conditions.

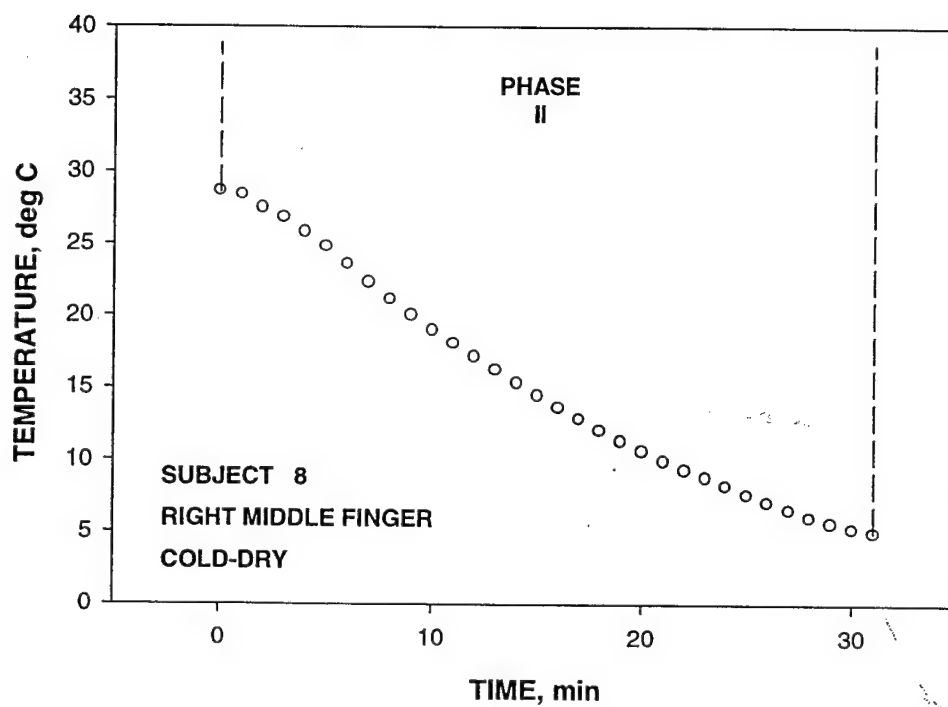
PHASE II: This intermediate *phase* is always exhibited by all subjects as a natural response of fingers to cold, whether protected by gloves or exposed, Figs. 1-3. This *phase* is best characterized by an exponential-like response, i.e., a fast initial temperature drop followed by a gradual leveling-off. Temperature changes observed in this *phase* are usually due to the step-like transition from high (basal) to low (nutritional) blood perfusion rate, which occurs at the beginning of this *phase*. The usually observed monotonic and "smooth" temperature change may be interrupted by small, short duration temperature fluctuations. This *phase* can be further represented by an exponential time constant calculated by a least-squares curve fitting procedure and by its overall duration, as listed in Table 2.

PHASE III: This final *phase* is the most complex and is not always exhibited by subjects or in all environmental conditions. It involves neuro-control and/or locally controlled periodic alterations of blood supply to the finger effected by gradual opening-closing cycles of the vaso-constricted blood vessels. The opening portions, which are termed "cold induced vasodilatation" (CIVD), facilitate the reintroduction of warm blood to the fingers thereby elevating their temperature. This temperature increase occurs relatively fast and may elevate finger temperatures to levels close to the initial, e.g., Fig. 1(f). Characterization of this *phase* may include factors like Δt_{peak} , Δt_{period} , ΔT_{peak} , etc. (Daanen and Hues, 1995).

Examination of Fig. 1 suggests further classification of this *phase* consequent to wave form as follows:



(a)



(b)

Fig. 3: Type-C response

- (1) small frequent waves ($\Delta T \leq 1^\circ\text{C}$), Fig. 1(a);
- (2) intermediate frequent waves ($\Delta T = 1-3^\circ\text{C}$), Fig. 1(b);
- (3) large frequent waves ($\Delta T \geq 3^\circ\text{C}$), Fig. 1(c);
- (4) increasing waves, Fig. 1(d);
- (5) decreasing waves, Fig. 1(e); and,
- (6) alternating (variable size) waves, Fig. 1(f).

With these definitions, 3 types of overall patterns of response of individuals exposed to cold environmental conditions can be identified in terms of the above *phases*:

TYPE A: exhibits all three *phases* (I+II+III), Fig. 1.

TYPE B: exhibits only two *phases*, as follows:

B₁ : exhibits *phases* I+II, Fig. 2(a).

B₂ : exhibits *phases* II+III, Fig. 2(b).

TYPE C: exhibits *phase* II only, Fig. 3.

In terms of durations, each one of the phases may further be represented by either of the following groups: short (≤ 30 min), intermediate (30-60 min), and, long (≥ 60 min).

RESULTS AND DISCUSSION

Data used in the analysis are presented in Appendices A and B. Average durations of the 3 phases and endurance times for all experiments for both environmental conditions are shown in Fig. 4. Also shown are the average cross-gender results. It is clearly seen that the average durations of *Phase II* are the longest for both environments at 28.73 min for the cold-dry and 61.69 min for the cold-wet conditions. Durations of each of the three phases are longer in the milder environment (cold-wet; $p < 0.001$ for *Phases II* and *III*), consistent with the result for the average overall durations ($p < 0.001$), with the ratios ranging between 1.7 and 2.9.

Comparison between genders indicated that the male subjects in this study were able to endure the cold exposure better than the female subjects (duration ratios of 1.74 and 1.38 for the cold-dry and cold-wet, respectively, $p < 0.05$). Females exhibited a longer average duration of *Phase II* than did the males in the cold-wet condition (NS) and much shorter durations in all other phases and environmental conditions ($p < 0.05$).

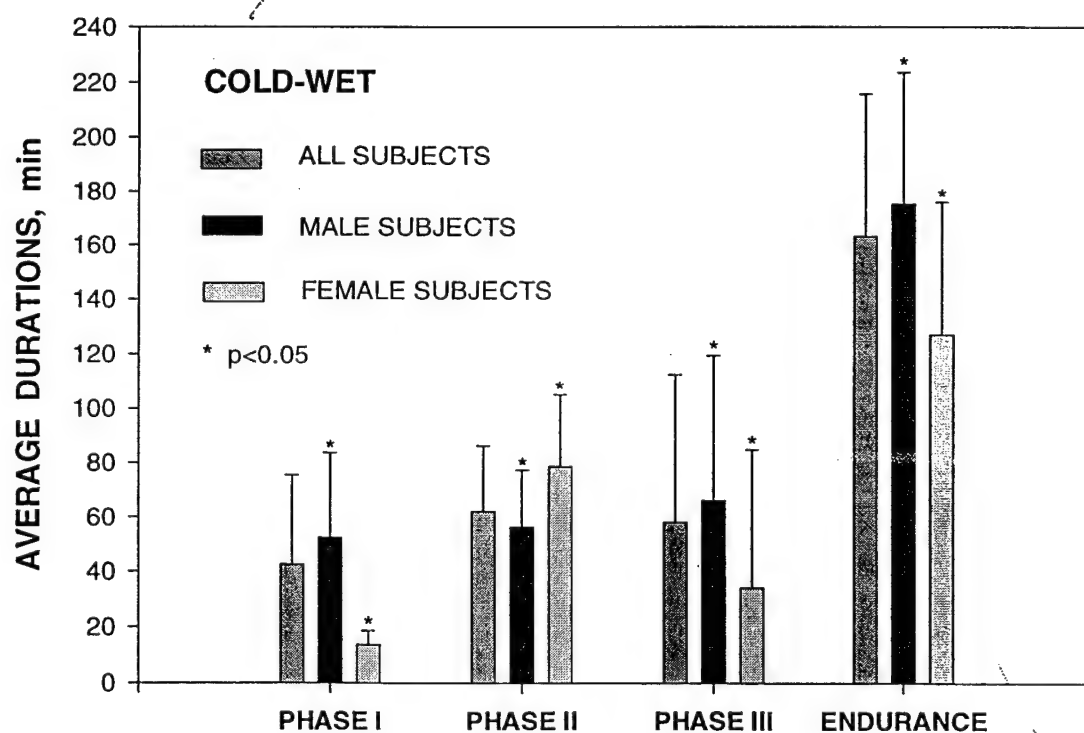
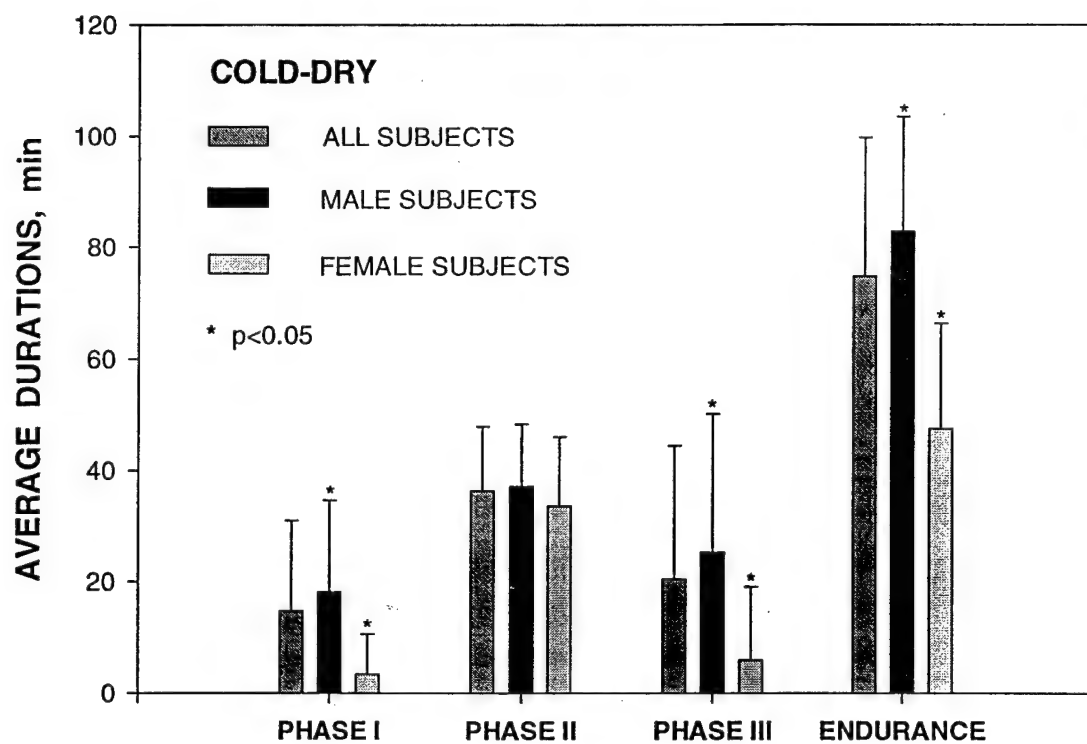


Fig. 4: Average durations of the three phases and overall endurance times for all subjects and gender comparisons in the cold-dry and cold-wet conditions.

These and the following results comparing the genders should be construed as suggestive only in view of the small group size in this study. Moreover, the genders were unequally represented with 6 male subjects participating versus only 2 females. However, each subject was tested 7 times in each condition and readings were taken on both contralateral hands, providing a relatively large number of repeated measurements of the fingers in the cold environments.

Endurance times were correlated with anatomical and physiological parameters by calculating Pearson's coefficients. It was found that endurance times correlated with finger-tip diameter and initial temperature, finger volume and with final rectal temperature ($p < 0.001$). Initial rectal temperature, which could have been taken as a precursor to endurance times in cold exposure, correlated for the cold-dry condition ($p < 0.05$) only. Gloves and finger length were not found to affect endurance times significantly in either test condition.

It is recalled that there might have been 4 reasons for ending a test: voluntary withdrawal by the subject, reaching the set US Army endurance temperature of 5°C (USARIEM Type Protocol, 1994), withdrawal by the medical monitor, or end of the test time. In this series of tests no withdrawal by the medical monitor occurred. Figure 5 shows the reasons due to which the tests were ended in both environmental conditions. It is noted that none of the subjects was able to stay for the planned 4 hours in the cold-dry condition while some 18% were able to do so in the milder, cold-wet condition. Voluntary withdrawal, due to a variety of usually unspecified reasons, accounted for about 60% of the cases in both conditions. The female subjects accounted for the majority of the cases in which tests have ended because finger-tip temperature reached the endurance limit of 5°C : 62% in the cold-dry and 77% in the cold-wet conditions, all occurring in *Phase II*. Actually, 93% (cold-dry) and 71% (cold-wet) of all tests involving females in this study were ended due to their finger-tips reaching the set endurance limit. When the data is analyzed further, it becomes evident that the female subjects in this study exhibited a Type-C response much more than did the males (see Fig. 6). These figures may be expected to be even higher when larger groups of subjects, of even gender representation, would be studied.

Figure 6 shows the distributions of response-types in the cold according to the

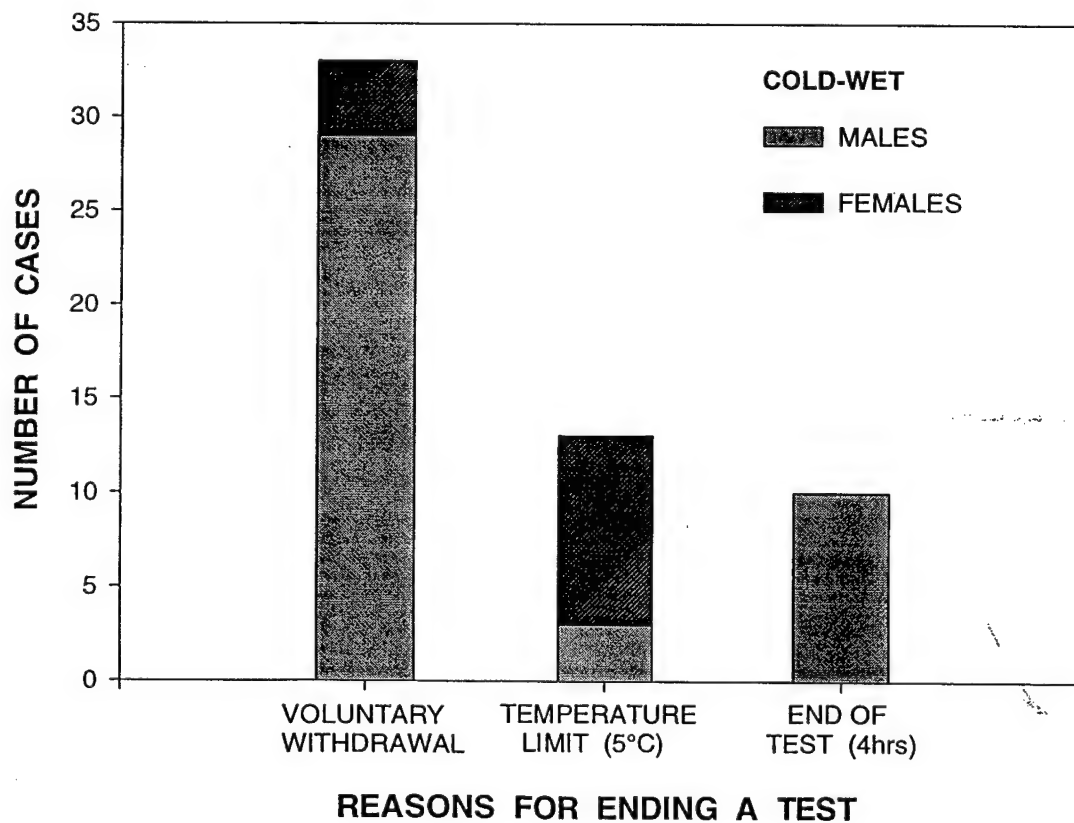
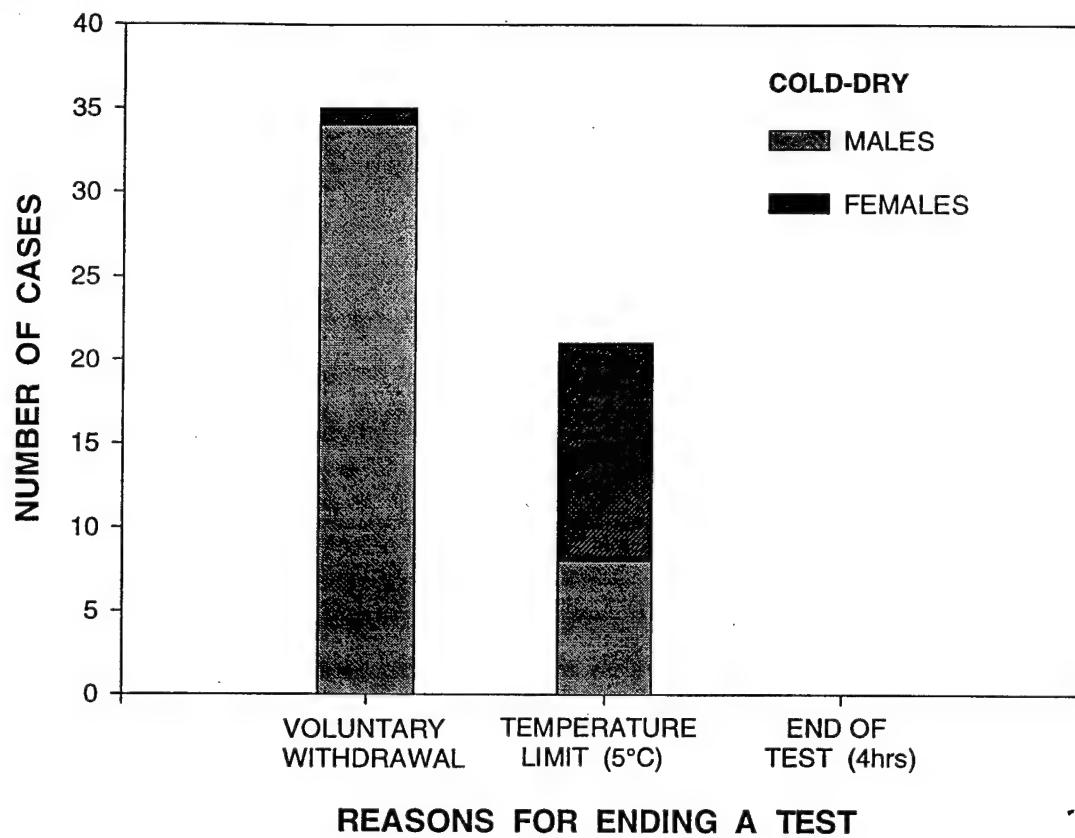


Fig. 5: Reasons for ending a test in the cold-dry and the cold-wet conditions.

preceding definitions. Three parameters are utilized to establish these distributions in both environmental conditions: (a) left vs. right hands of all subjects; (b) dominant vs. non-dominant hands of all subjects; and, (c) both hands of males vs. females. In both environmental conditions there do not seem to be significant differences between the classifications due to left vs. right or dominant vs. non-dominant hands. One result is that many more Type A response are observed as the environmental conditions become milder (72% in the cold-wet vs. only 45% in the cold-dry condition, for both hands). This raises an interesting question regarding the change in overall response of fingers in a cold environment and their dependence on the actual condition. What the present data seem to suggest is that the fingers of the same subject may alter their response-pattern as a function of the environmental condition they are exposed to.

When the gender responses are analyzed, it is clearly seen that the two uneven groups are different in their response attributes in both environmental conditions. As a general trend, male subjects seem to exhibit Type-A response more readily than females in both environmental conditions. When the individual temperature records of each of the females' fingers are analyzed, it is realized that most of their stay in the test was in *Phase II* wherein the temperature of the finger drops exponentially due to vasoconstriction. Generally, females' stays in either *Phase I* or *III* were relatively short (see also Fig. 4). This seems to imply that the female subjects in this study were not quite able to enjoy the thermal benefits of either the initial period of maintained high blood flow (*Phase I*) or the final period of cold induced vasodilatation (*Phase III*) as well as did the male subjects, thereby compromising their endurance to a cold exposure.

Average wave patterns were generated for the cold induced vasodilatation waves (*Phase III*) and are presented in Fig. 7. These curves were constructed by adjoining average individual waves sequentially. Therefore, the total duration of the constructed average pattern may exceed the set total length of the test, as seen in Fig. 7. It is noted that while the general shapes of these curves are basically similar for the 2 environmental conditions, they do differ in certain aspects. In the cold-dry condition, there appear to be fewer waves than in the cold-wet condition. This indicates the effect of the milder environmental condition which the subjects were able to endure for a longer time. Much of this ability is achieved by these periodic bouts of increase-decreased blood supply to the finger-tip beyond that afforded by the initial *Phase I*.

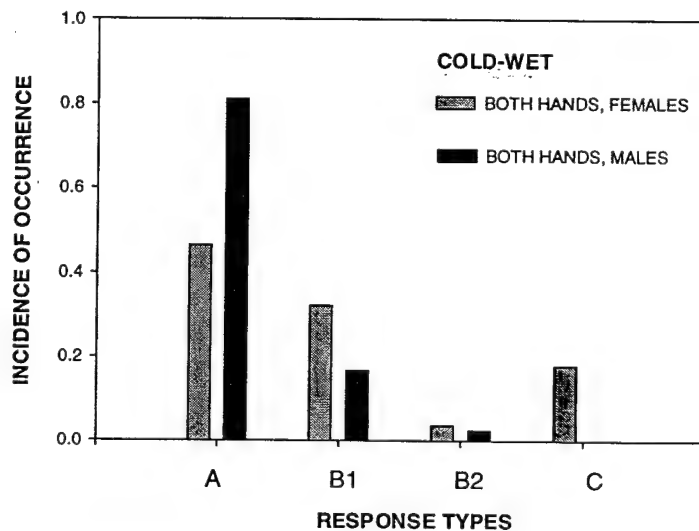
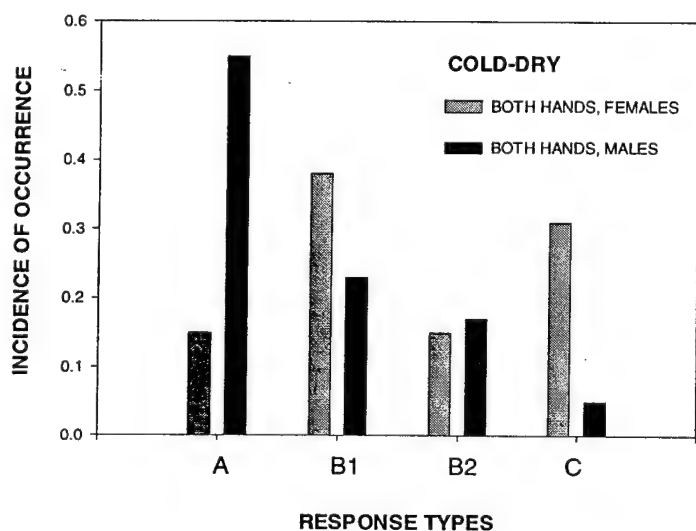
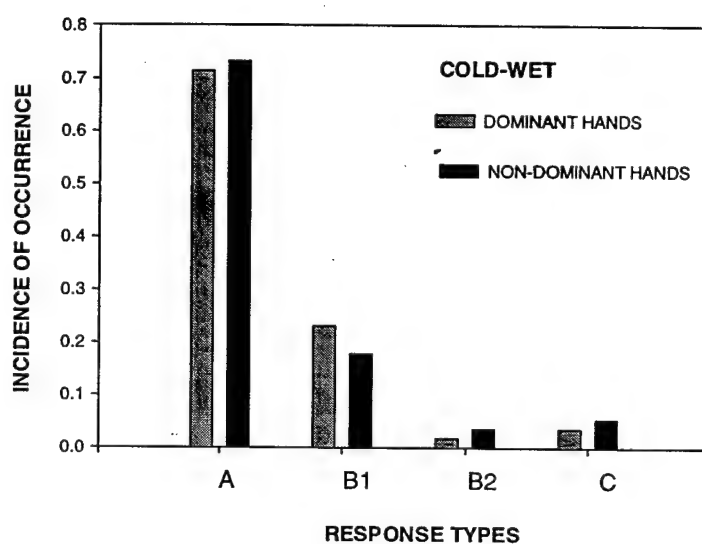
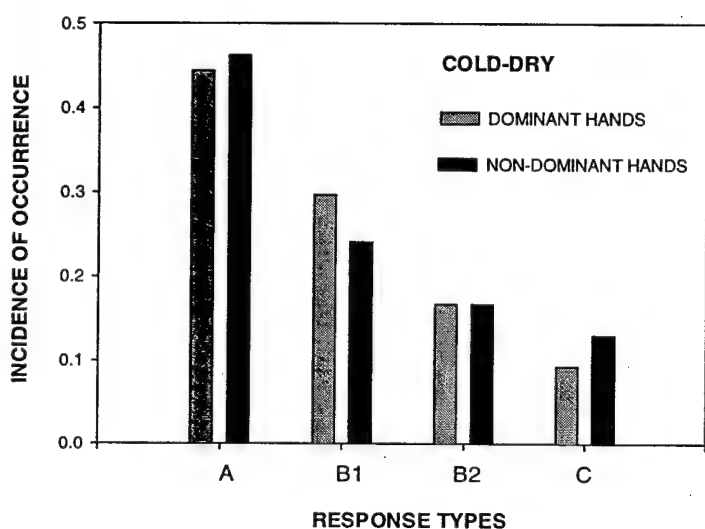
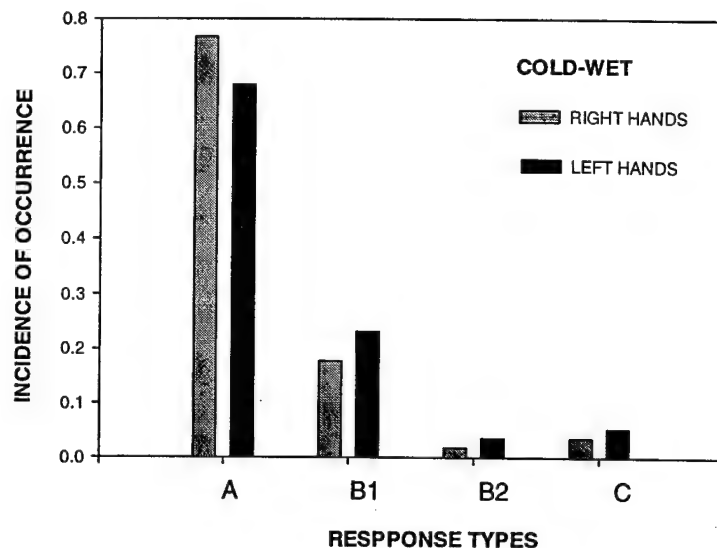
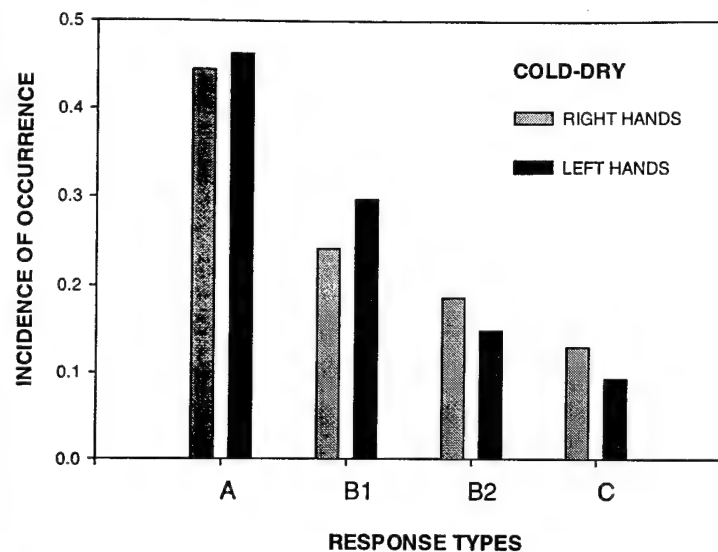


Fig. 6: Response type occurrences for the cold-dry and cold-wet conditions as determined by right/left, dominant/non-dominant hands and gender distributions.

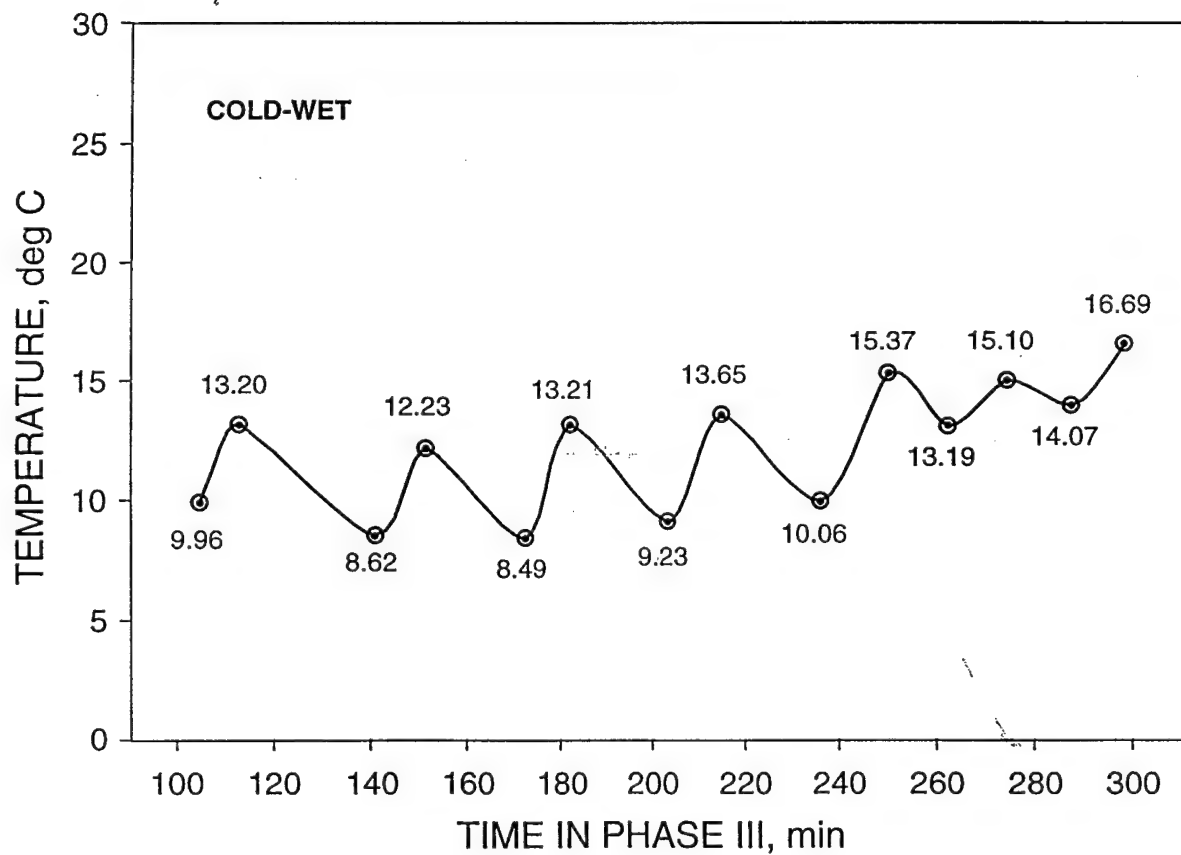
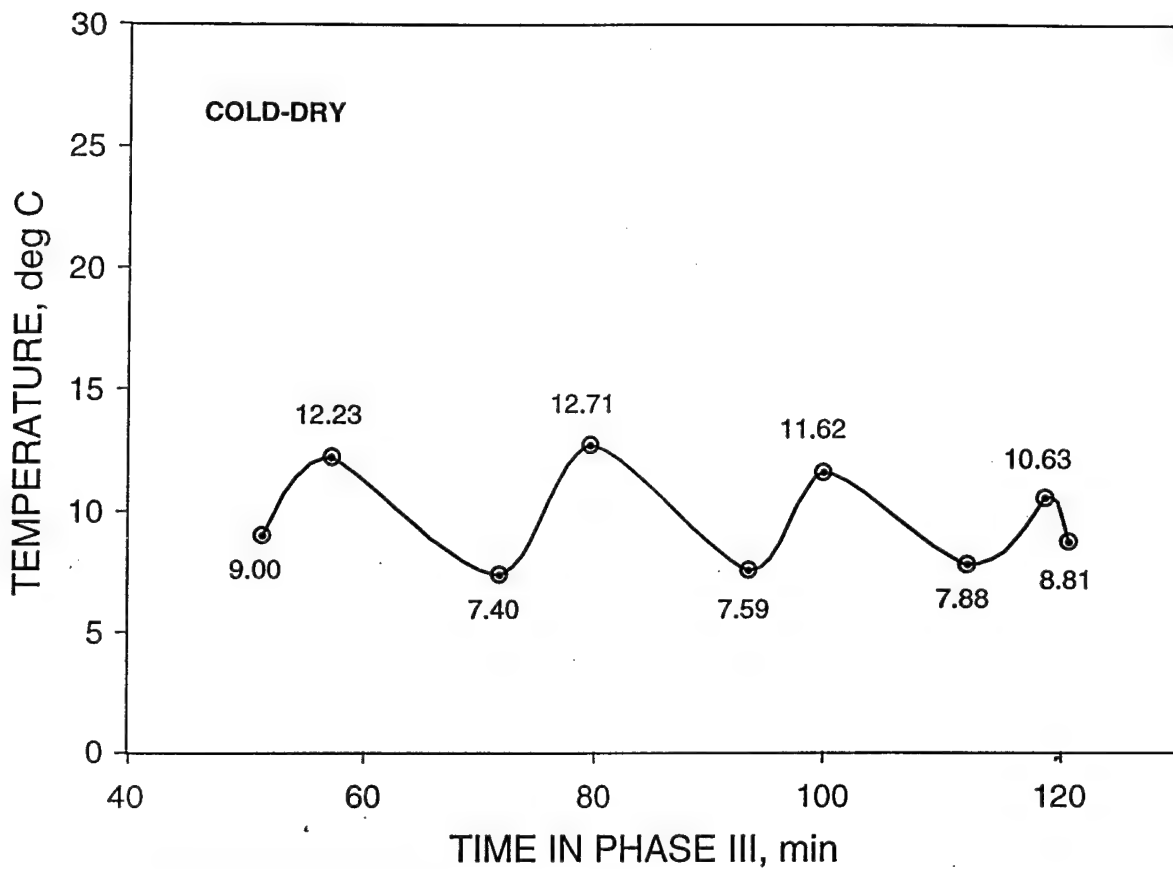


Fig. 7: Average CIVD wave patterns for the cold-dry and cold-wet conditions.

The average onset temperatures for CIVD (*Phase III*) are $9 \pm 2.68^{\circ}\text{C}$ in the cold-dry and $9.96 \pm 2.99^{\circ}\text{C}$ in the cold-wet conditions ($p < 0.01$). Livingstone (1976) found these temperatures to be in the range of $3.5\text{--}4.6^{\circ}\text{C}$ while Daanen and Hues (1995) measured them at $6.9\text{--}11.2^{\circ}\text{C}$. Both studies, however were conducted under different conditions with the bare fingers immersed in cold water. The onset times of CIVD for these two conditions are 51.29 ± 19.56 and 104.65 ± 34.69 min, respectively ($p < 0.01$). Average wave frequencies seem to be higher in the colder condition (cold-dry) amounting to about $3\frac{1}{2}$ waves/hr versus only slightly less than 2 waves/hr in the milder condition. Average wave amplitudes, or the differences between wave peaks and troughs, seem to be of the same order of magnitude in both conditions with a strong tendency for increasing the trough values farther into the exposure in the milder condition. Also seen is a trend for increasing average finger-tip temperature in the milder condition following a slight initial drop.

Most of the average waves shown in Fig. 7, and in particular the first few ones in both conditions, have the characteristic of the rise time being shorter than the drop time. This is due to the nature of the heating-cooling mechanism of the finger-tip as elaborated and quantified by Shitzer et al. (1996). Accordingly, when blood supply to the finger-tip is increased, a portion of the heat it carries goes to elevate tissue temperature and another, continuously increasing portion is lost to the environment. This is the physical reason for the quicker rise time as compared to the drop time during which the driving force for heat loss, i.e., the temperature difference with the environment, decreases. The ratios between wave rise and drop times are in the range of 0.4-0.57 for the first 3 average waves of the cold-dry condition and 0.29-0.54 for the first 4 average waves of the cold-wet condition. Similar values were reported at 0.56 for a bare finger placed in a cooling box by Werner (1977) and 0.53-0.89 for a bare finger immersed in cold water by Daanen and Hues (1995). Both these support the finding that the rise time is shorter than the drop time for fingers during cold induced vasodilatation.

Finally, we introduce the concept of "endurance extension" by the CIVD waves. Rapid finger-tip temperature decline, characteristic of *Phase II*, if continued uninterrupted would cause this temperature to reach uncomfortable and even dangerously low levels. Suppose the lowest acceptable finger-tip temperature is set at

some value consistent with safety and comfort, e.g., 5°C (USARIEM Type Protocol, 1994). This then becomes the physiological criterion for the endurance limit. The net beneficial effect of CIVD would be to supply heat to the finger-tip from the warmer core of the body such that it is maintained at a sufficiently high temperature preferably above the endurance limit. When the decline trend of *Phase II* is extrapolated, the time at which it would have intersected with this set endurance limit can be calculated, as shown in Fig. 8 and listed in Table 2.

The approximating curve is calculated by least-squared fitting of a first-order exponential function to the temperature data in *Phase II*. This obtains an exponential time constant for each subject and for each finger which characterizes the decay of the finger-tip temperature. Average values of this parameter are listed in Table 2 for the 2 environmental conditions and for both hands, for left vs. right and for dominant vs. non-dominant hands. The average exponential time constant for both hands seems to be much shorter for the cold-dry (30 ± 7.7 min) than for the cold-wet condition (51.21 ± 16.51 min; $p < 0.001$) indicating, again, the strong effect of the environmental conditions on the response of the finger-tip to the exposure.

The extrapolated intersecting times with the set endurance limit for this exponential decline are also listed in Table 2. These numbers facilitate the calculation of the "endurance extension" due to CIVD which is the difference between the actual time at which a test had ended and the extrapolated time at which it would have had to end due to the finger reaching the set physiological endurance limit. Average results indicate about 13 min extension in the cold-dry versus about 31 min in the cold-wet condition. These average values, although not very large, represent a wide spread of the data, as indicated by the large standard deviations, and serve to both accentuate and quantify the beneficial thermal effects of CIVD.

CONCLUSION

The three Phases and the overall finger response-patterns defined in this study, are useful concepts in studying and classifying individual and population responses in the cold. Each of the phases seems to be strongly dependent on the intensity of the cold exposure which appears to shorten their durations and, therefore, shorten the

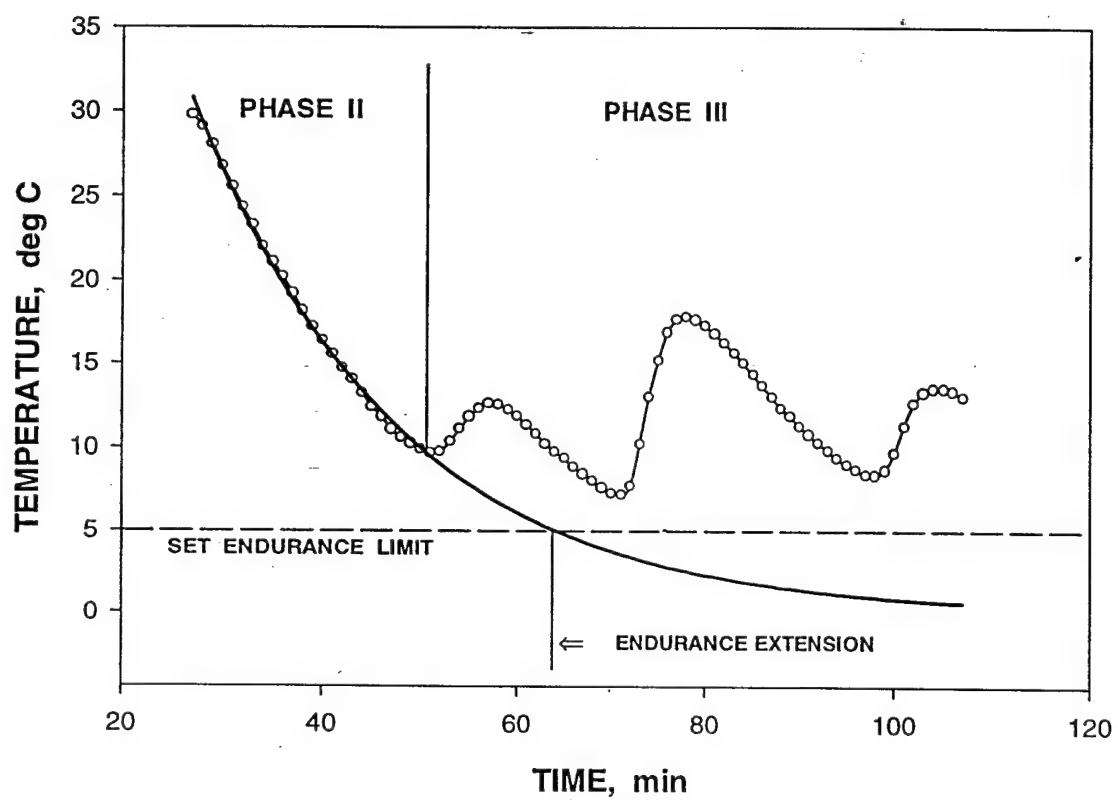


Fig. 8: Schematic drawing defining exposure endurance extension due to cold induced vasodilatation.

endurance of the individual to cold. Another effect of the environment is to enhance more Type-A response, capable of exhibiting all phases as it becomes milder. Differences between genders, although inconclusive due to the small and uneven numbers of male and female subjects in this study, suggest that resting female subjects were less tolerant to either cold condition. This is further accentuated by them reaching the set endurance limit of 5°C during *Phase II* in many of the tests while being, generally, unable to benefit from cold induced vasodilatation. However, this finding is complicated by differences in metabolic activity, anatomical structure and menstrual cycle phases and should, therefore, be studied further. This study also shows that the initial *Phase I*, during which finger-tip temperature remains high, is as significant a determinant of the endurance times as are the effects of *Phase III* during which CIVD occurs.

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	both hands	left hand	right hand	dominant hand	non-dominant hand
COLD-DRY					
Initial temperature, °C	30.02±3.65	29.68*±4.27	30.39*±2.87	30.18*±3.29	29.87*±4.01
Temperature drop, °C	1.00±1.79	1.19*±1.85	0.81*±1.73	0.94±1.87	1.07±1.73
Duration, min	14.78±16.18	15.33±16.40	14.21±16.09	14.61±16.22	14.96±16.29
COLD-WET					
Initial temperature, °C	30.40±3.81	30.22±4.16	30.58±3.44	30.81**±3.05	29.98**±4.43
Temperature drop, °C	1.40±2.28	1.26±2.02	1.55±2.53	1.56±2.23	1.25±2.35
Duration, min	42.70±32.82	43.54±33.39	41.86±32.53	43.23±32.33	42.16±33.59

* p<0.05 ** p<0.01

Table 1: Average values for *Phase I* comparing right-left and dominant--non-dominant hands for the cold-dry and cold-wet conditions

	both hands	left hand	right hand	dominant hand	non-dominant hand
COLD-DRY					
Exponential time constant, min	30.00±7.70	29.27±7.81	30.75±7.60	30.54±7.47	29.45±7.96
Duration, min	36.36±11.55	34.96±11.75	37.79±11.26	36.91±12.11	35.81±11.03
Calculated time at 5°C, min	68.88±26.30	67.77±26.75	70.00±26.04	69.89±25.68	67.85±27.13
Endurance extension, min	13.15±21.57	13.47±22.19	12.83±21.14	10.75±21.28	15.61±21.80
COLD-WET					
Exponential time constant, min	51.21±16.51	53.97±17.60	48.44±14.99	50.35±15.28	52.06±17.75
Duration, min	61.96±24.31	65.71*±27.82	58.20*±19.74	63.32±25.55	60.59±23.15
Calculated time at 5°C, min	132.31±54.28	137.68*±59.40	126.95*±48.57	131.88±48.03	132.75±60.32
Endurance extension, min	30.94±60.68	25.57*±63.77	36.30*±57.49	31.38±56.65	30.50±64.97

* p<0.05

Table 2: Average values for *Phase II* comparing right-left and dominant--non-dominant hands for the cold-dry and cold-wet conditions

APPENDIX A - Records of finger - base, middle and tip temperatures for all subjects and gloves in the cold-dry and cold-wet conditions.

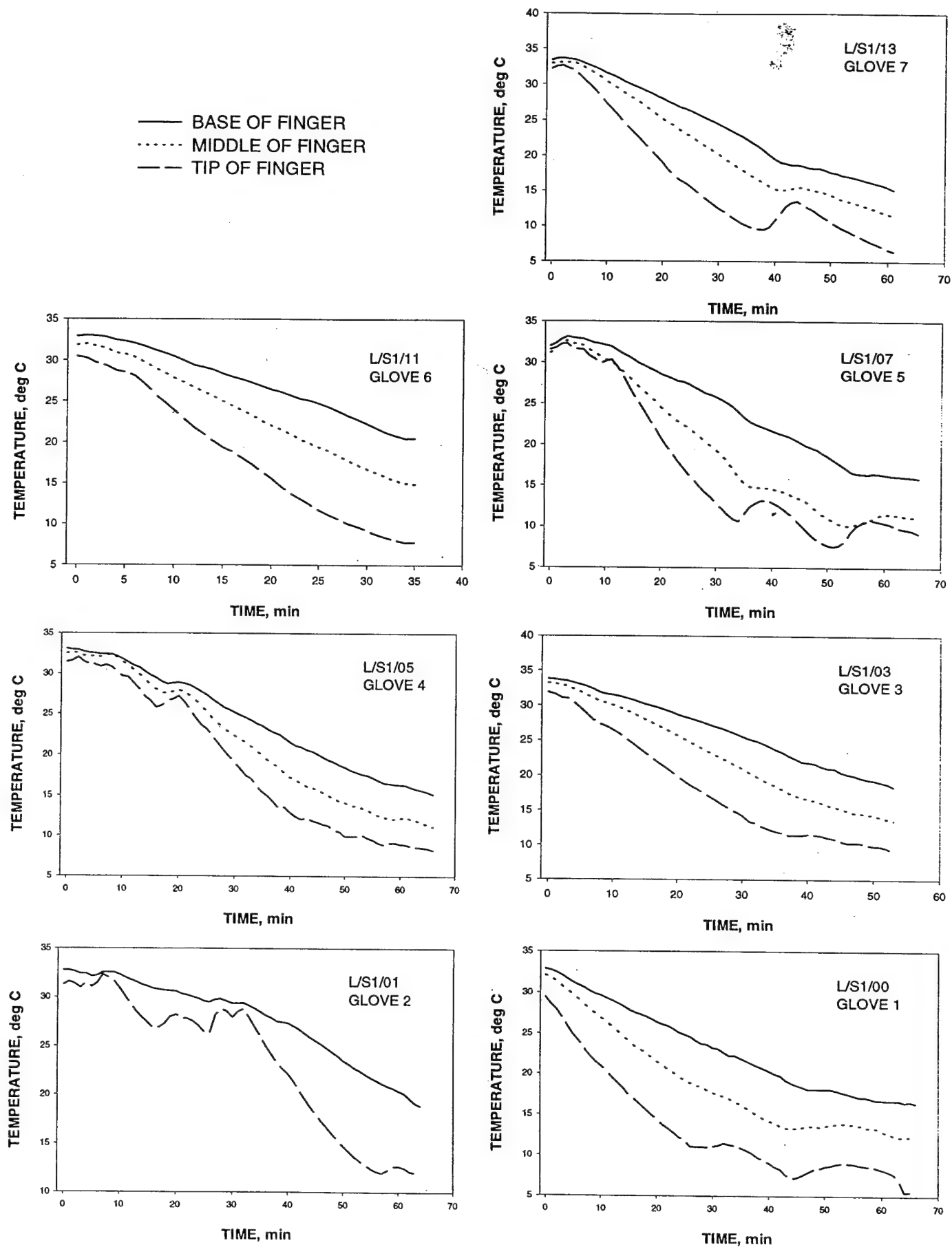


Fig. A.1 Temperature changes of the left middle finger of Subject 1 in the cold-dry condition.

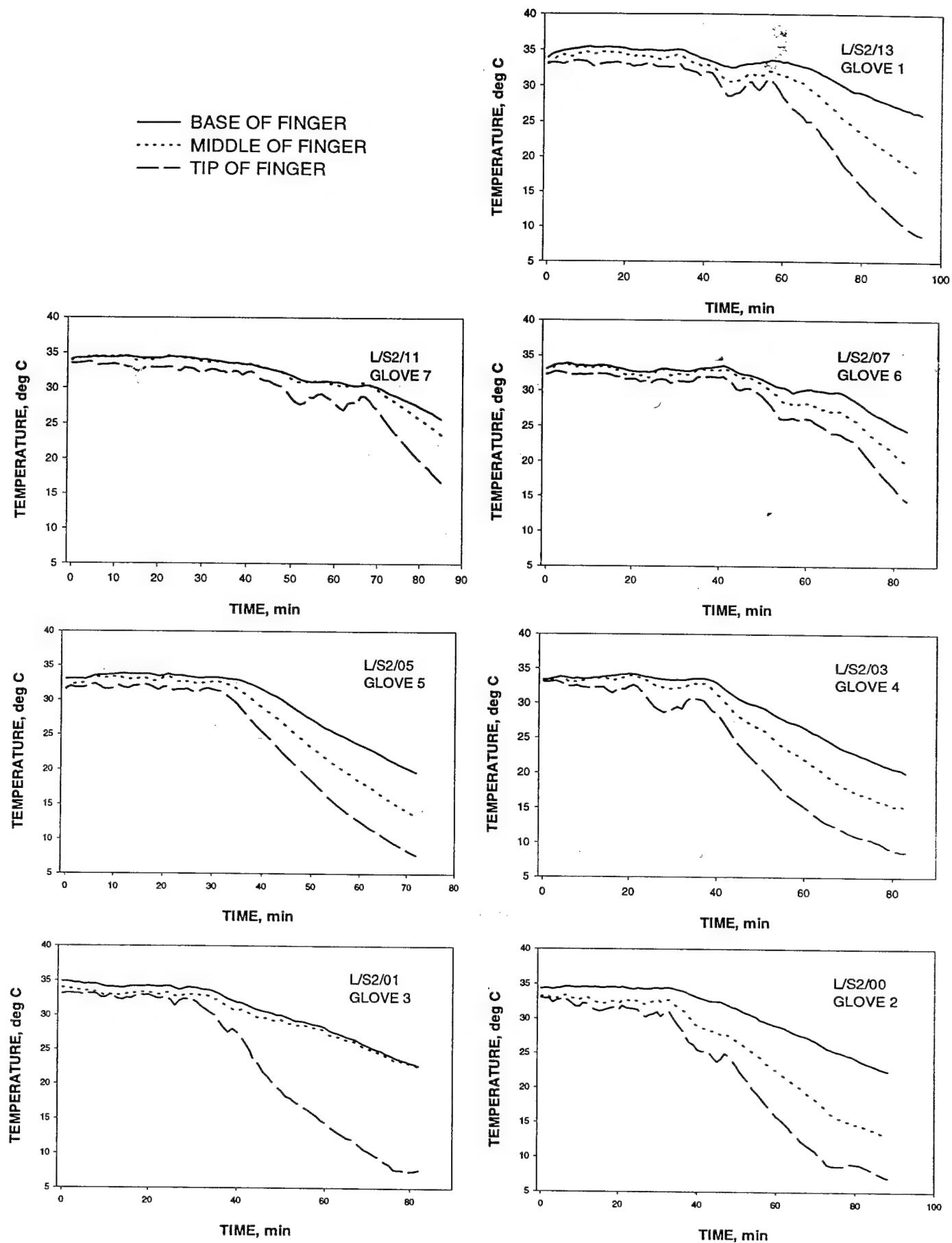


Fig. A.2 Temperature changes of the left middle finger of Subject 2 in the cold-dry condition.

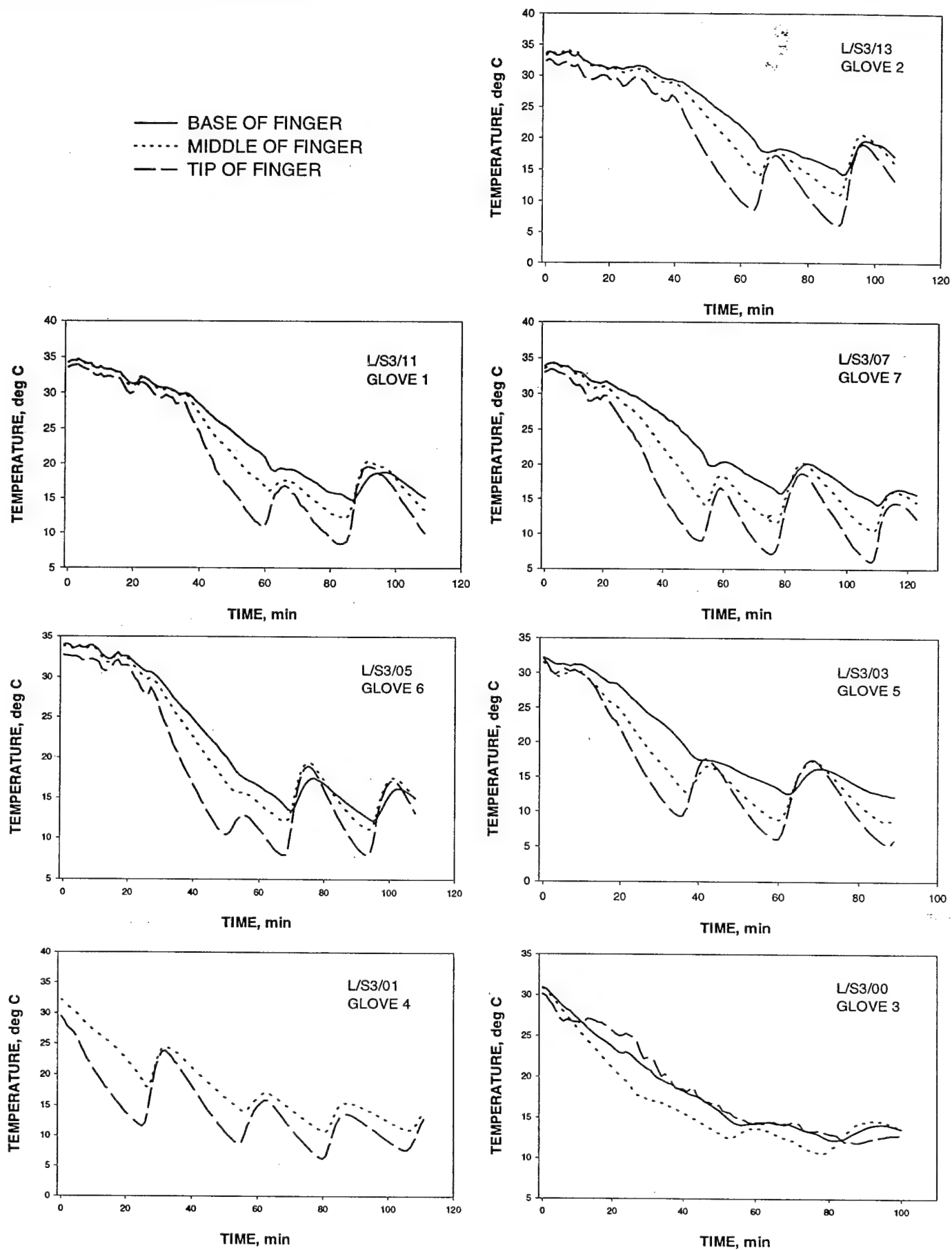


Fig. A.3 Temperature changes of the left middle finger of Subject 3 in the cold-dry condition.

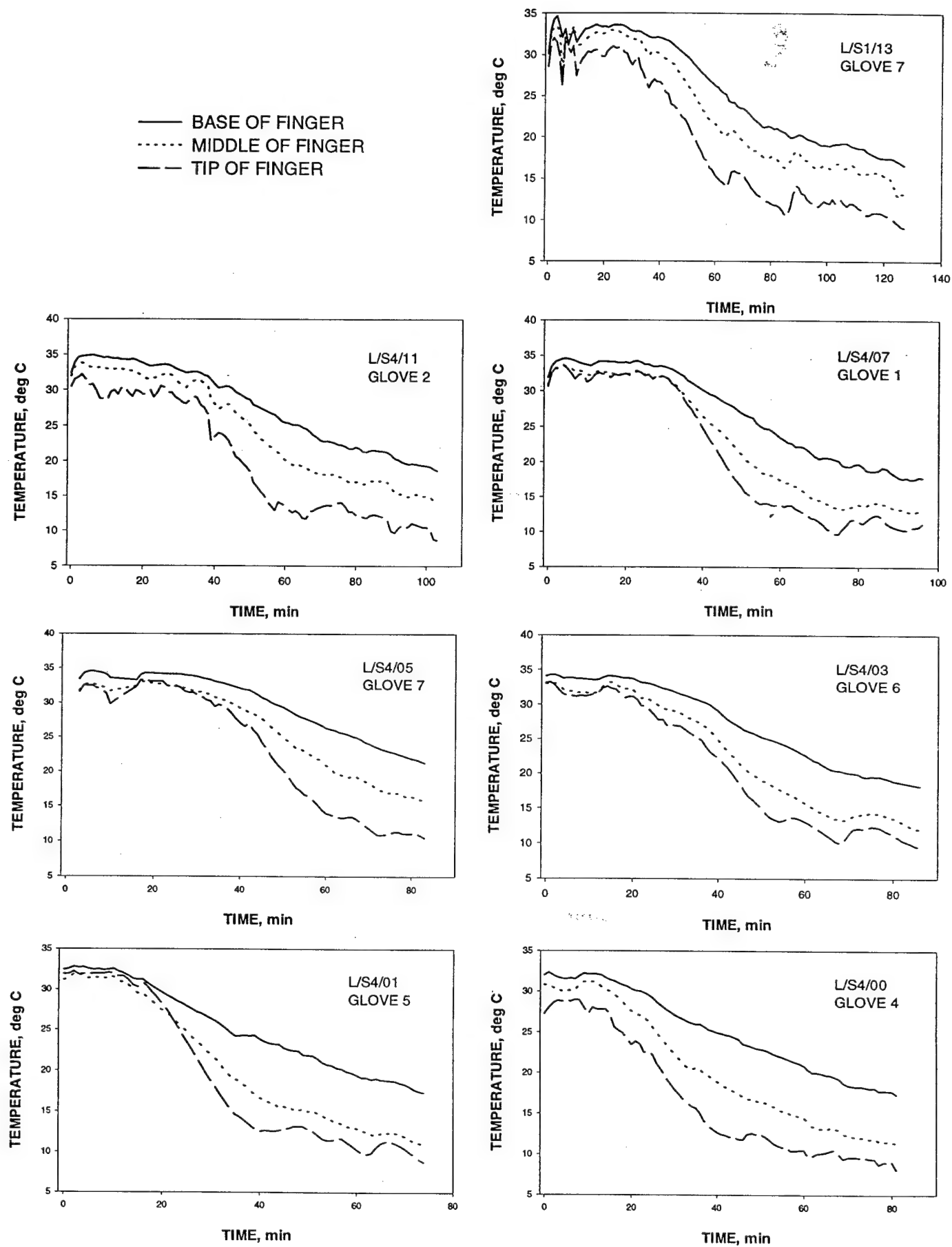


Fig. A.4 Temperature changes of the left middle finger of Subject 4 in the cold-dry condition.

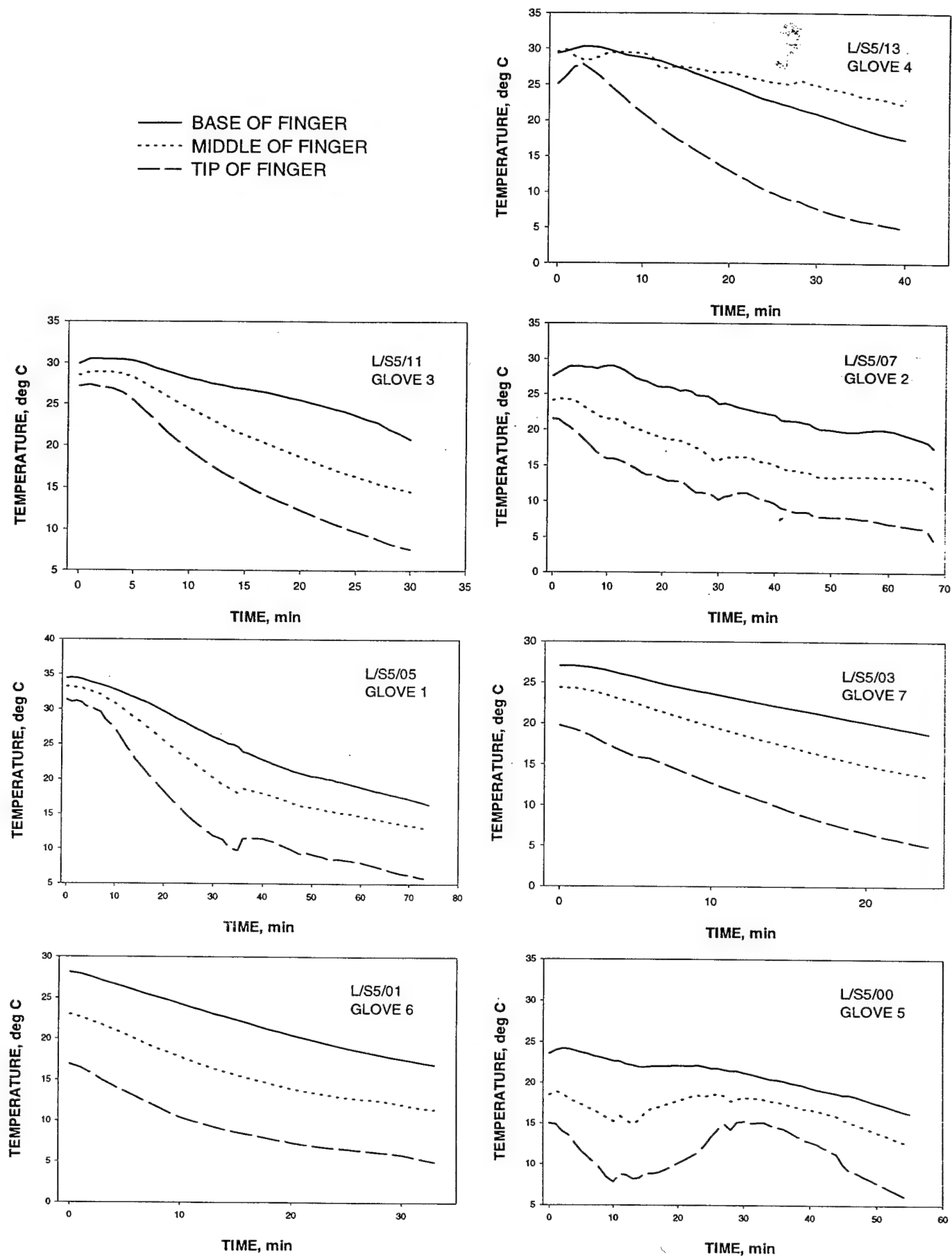


Fig. A.5 Temperature changes of the left middle finger of Subject 5 in the cold-dry condition.

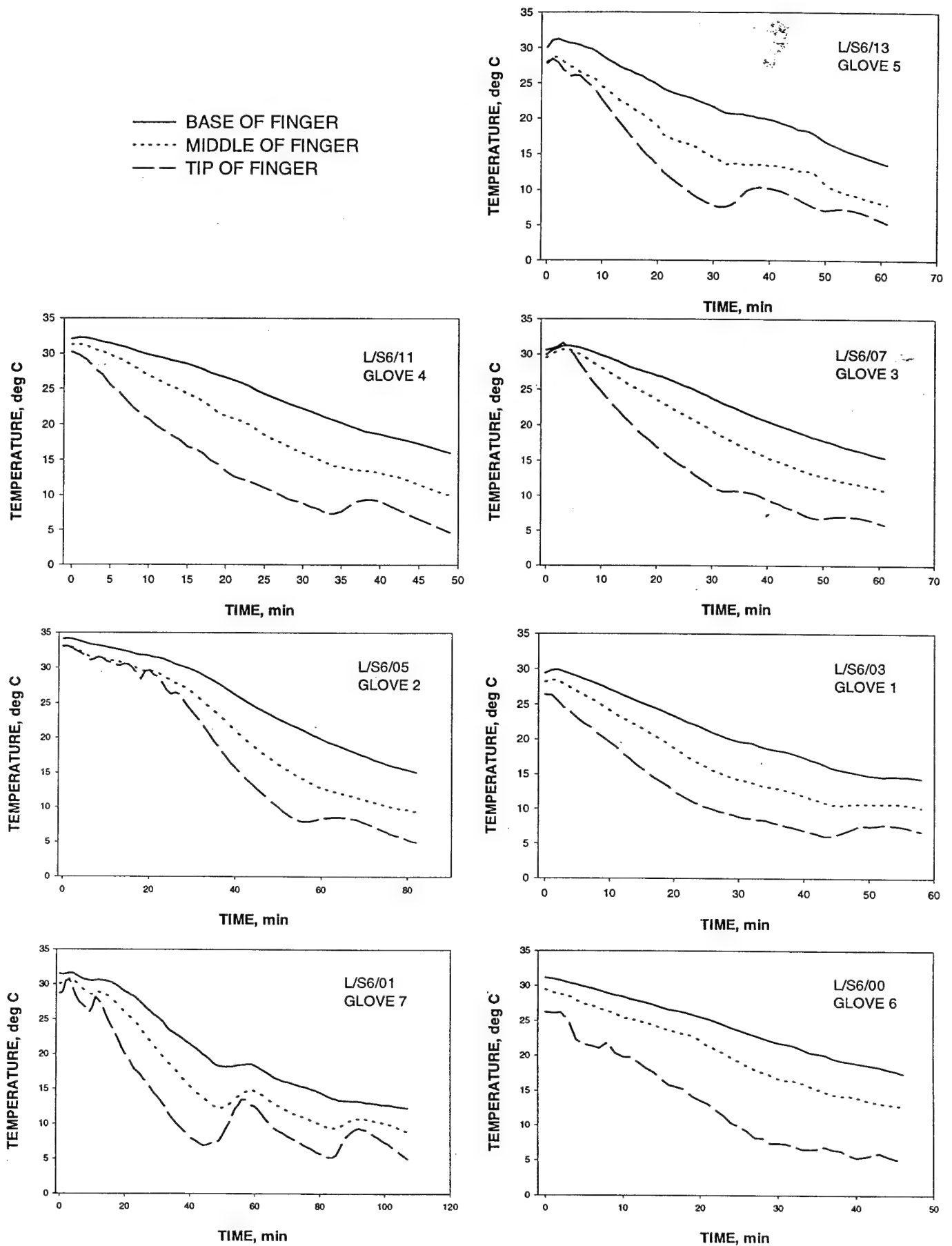


Fig. A.6 Temperature changes of the left middle finger of Subject 6 in the cold-dry condition.

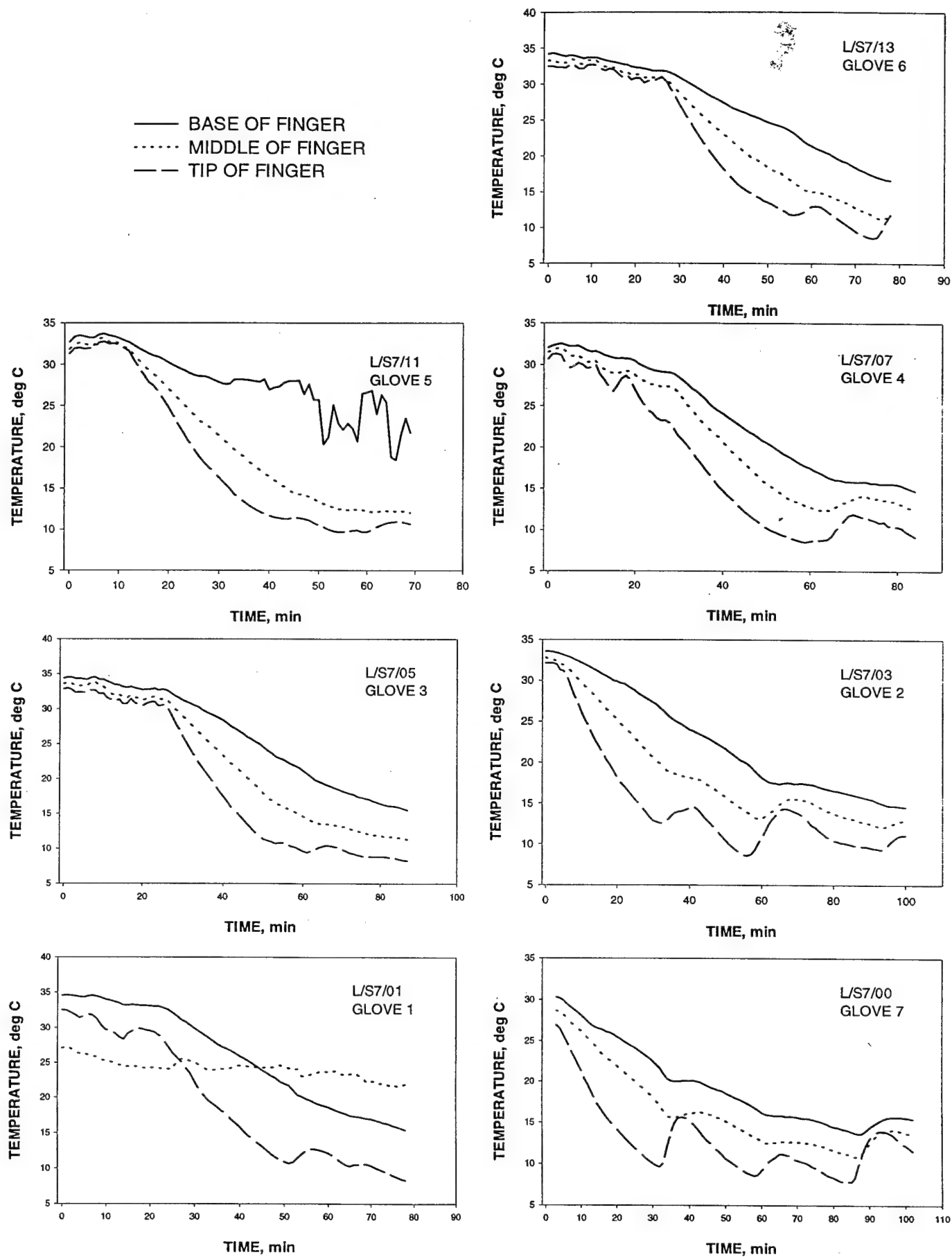


Fig. A.7 Temperature changes of the left middle finger of Subject 7 in the cold-dry condition.

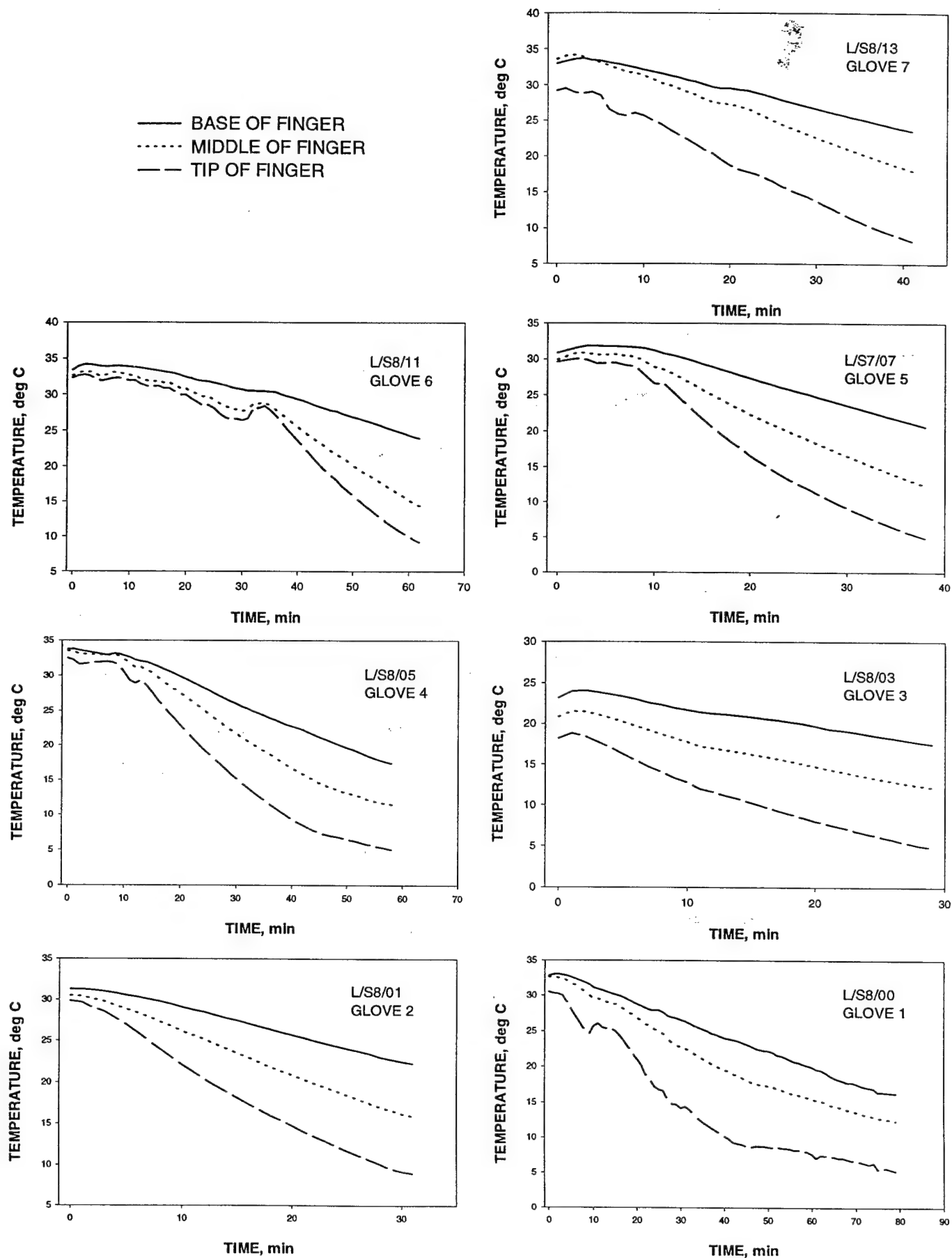


Fig. A.8 Temperature changes of the left middle finger of Subject 8 in the cold-dry condition.

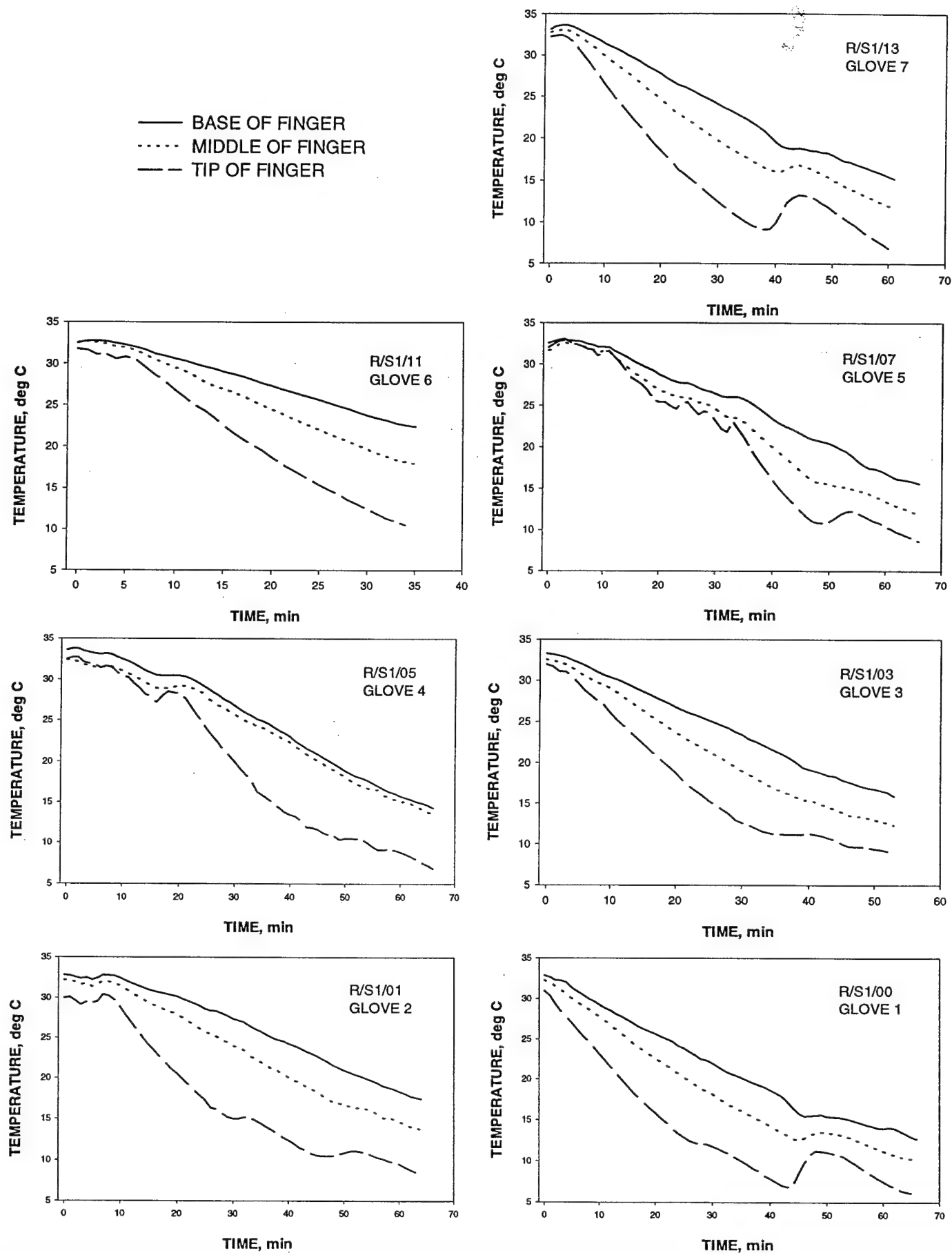


Fig. A.9 Temperature changes of the right middle finger of Subject 1 in the cold-dry condition.

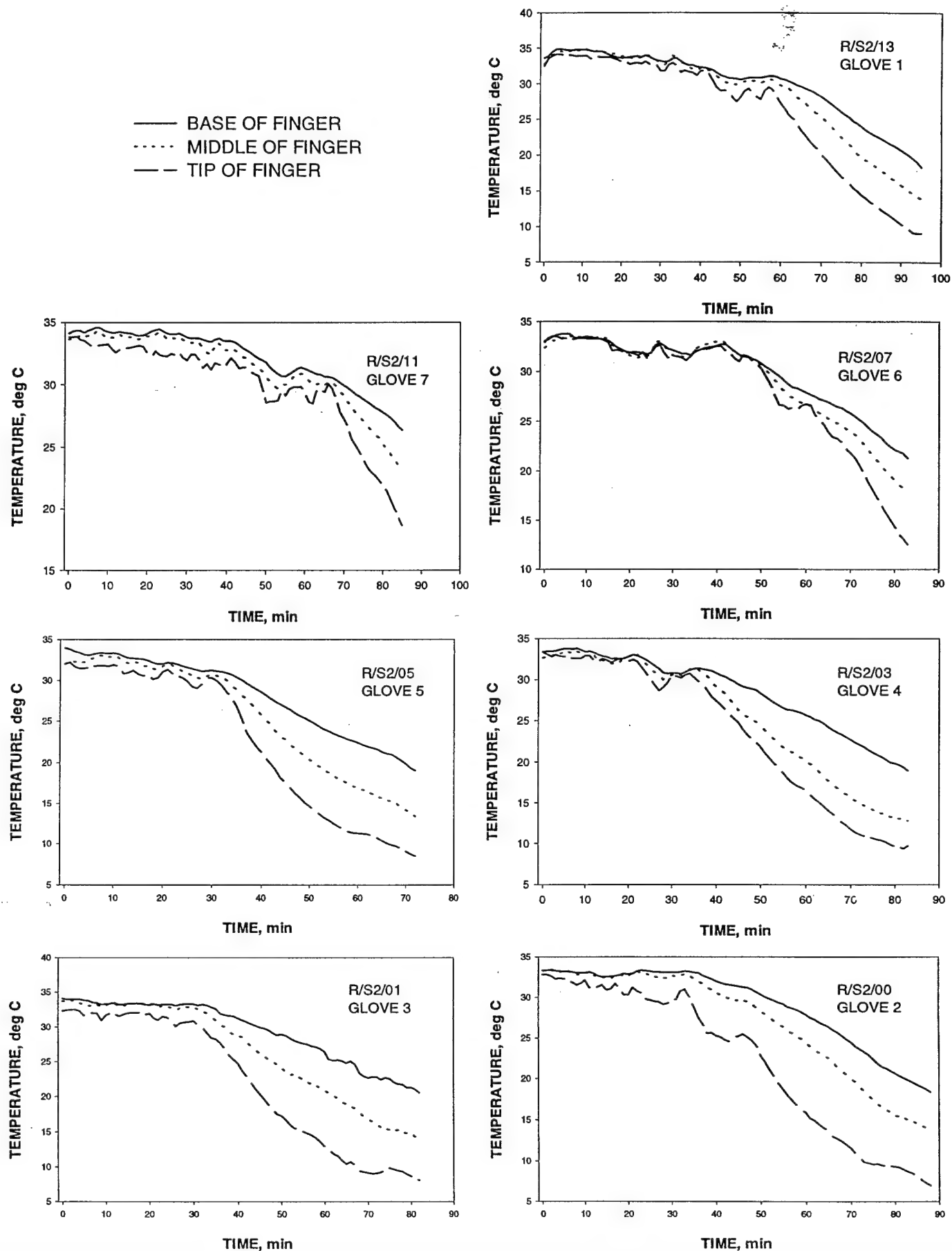


Fig. A.10 Temperature changes of the right middle finger of Subject 2 in the cold-dry condition.

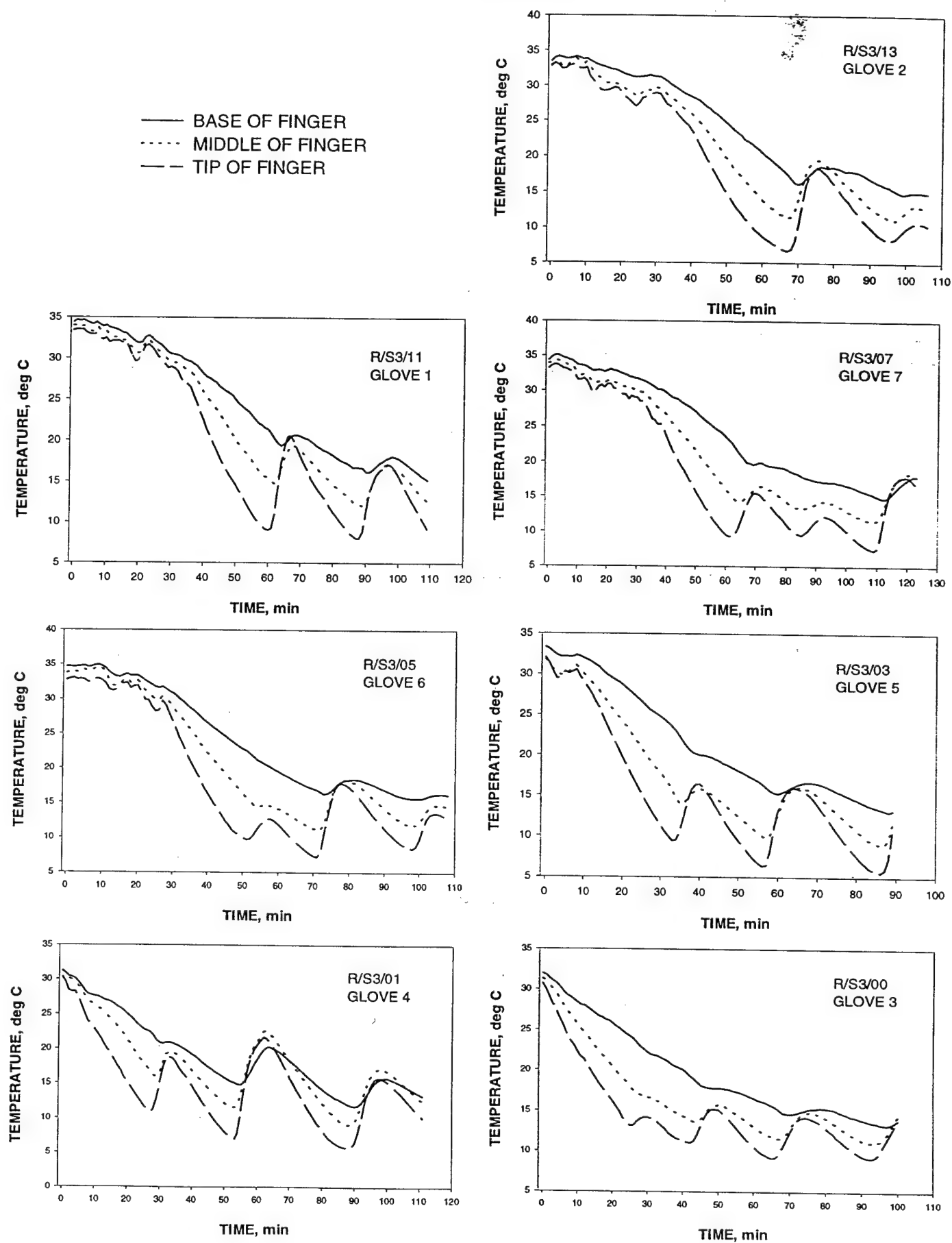


Fig. A.11 Temperature changes of the right middle finger of Subject 3 in the cold-dry condition.

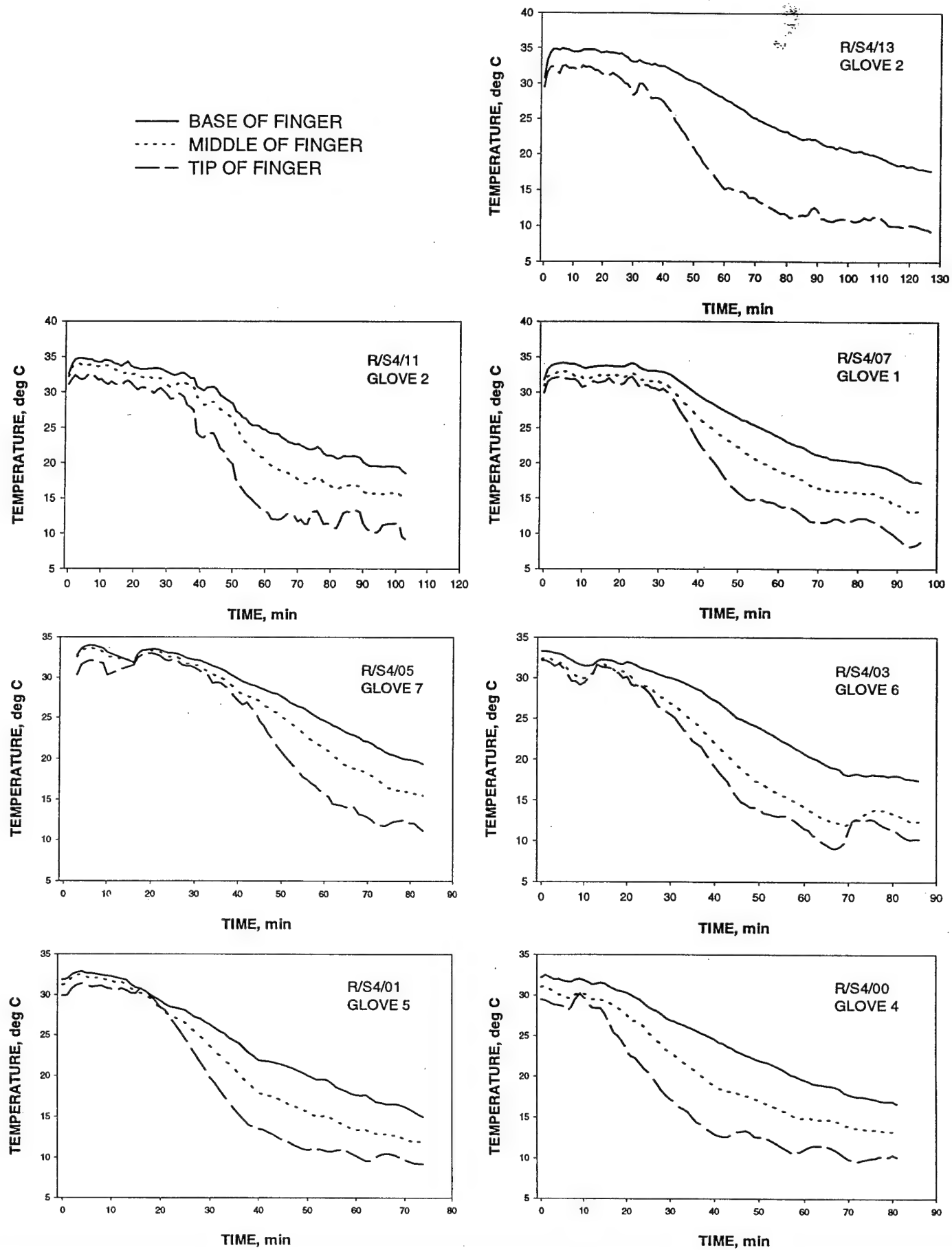


Fig. A.12 Temperature changes of the right middle finger of Subject 4 in the cold-dry condition.

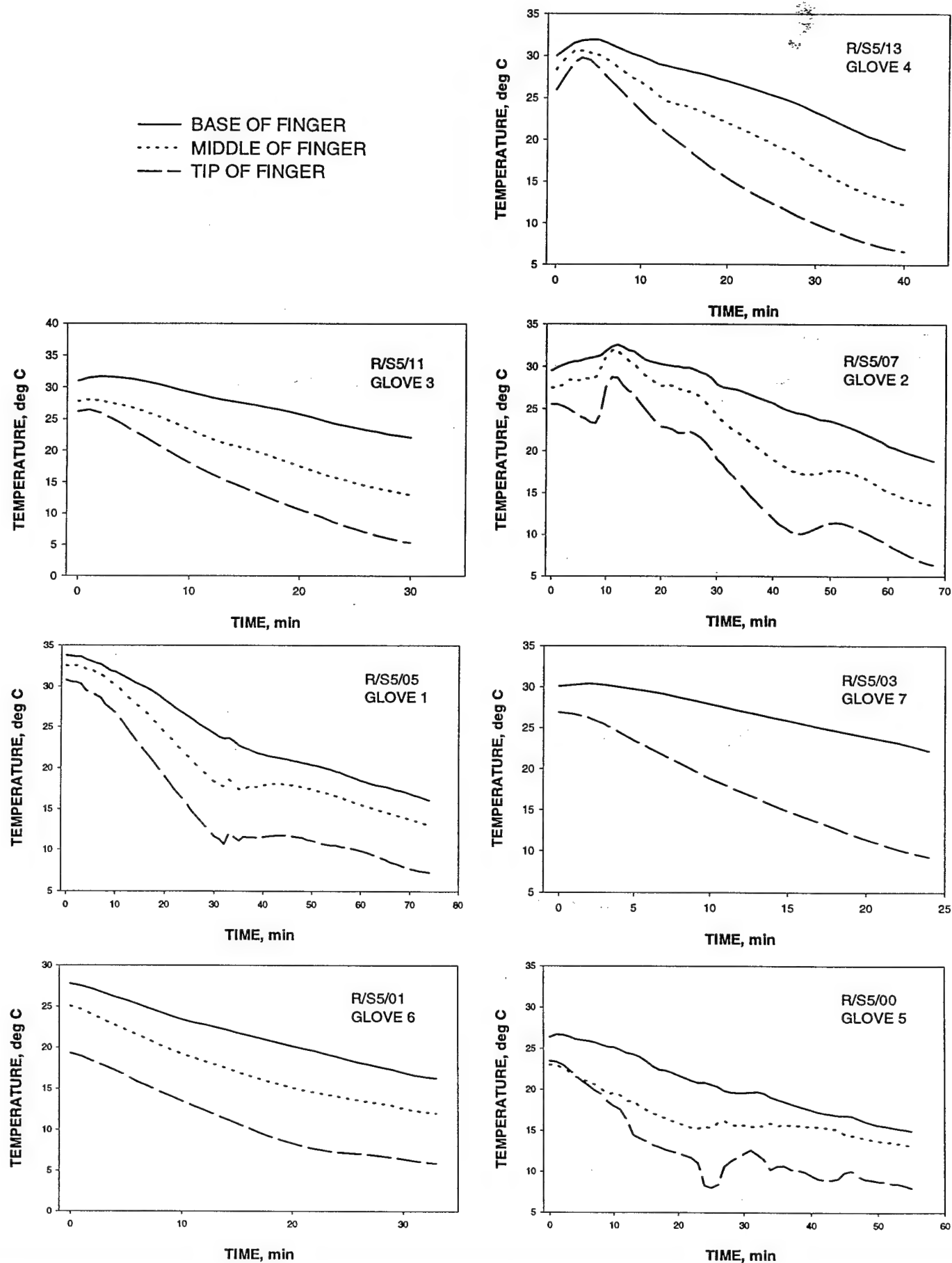


Fig. A.13 Temperature changes of the right middle finger of Subject 5 in the cold-dry condition.

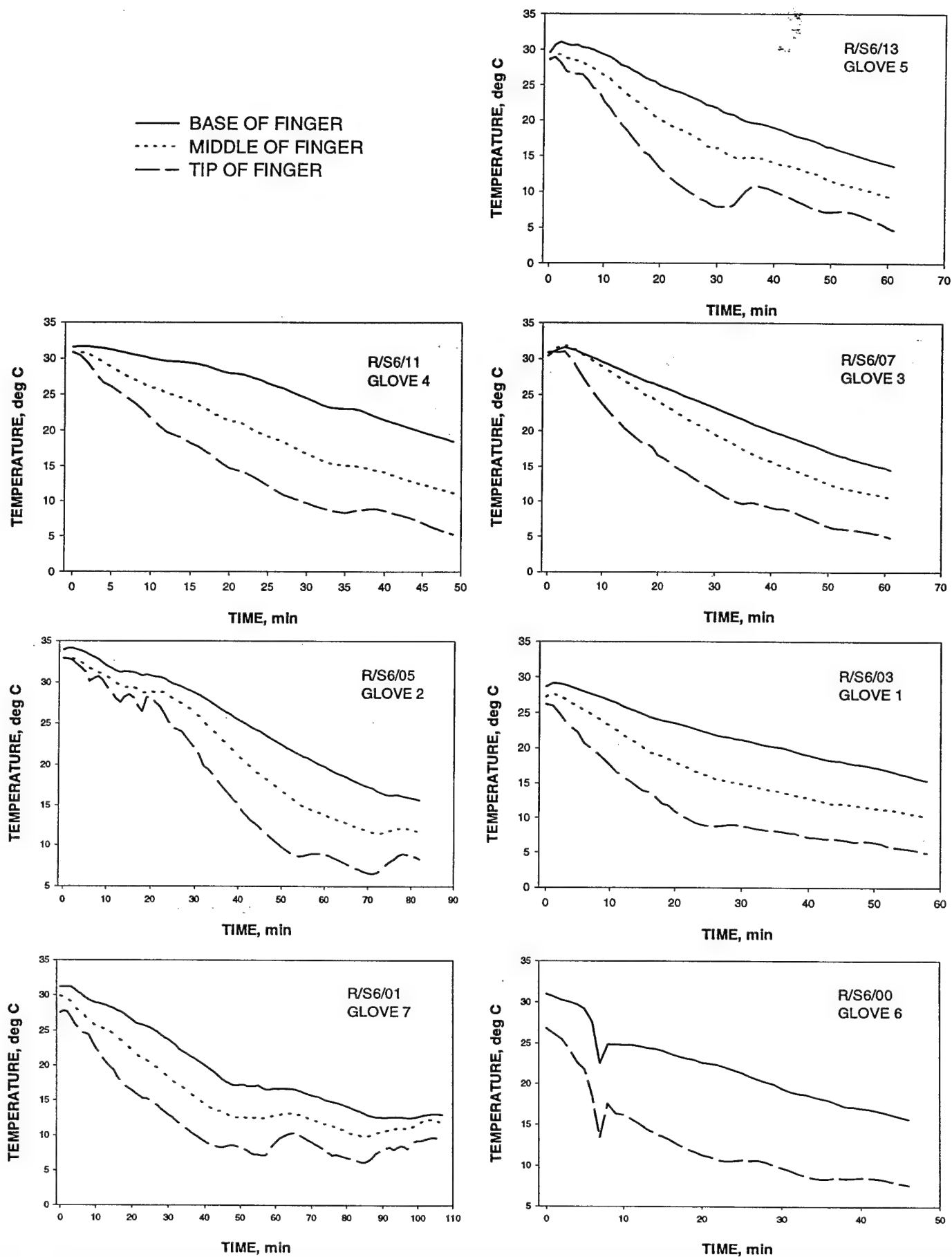


Fig. A.14 Temperature changes of the right middle finger of Subject 6 in the cold-dry condition.

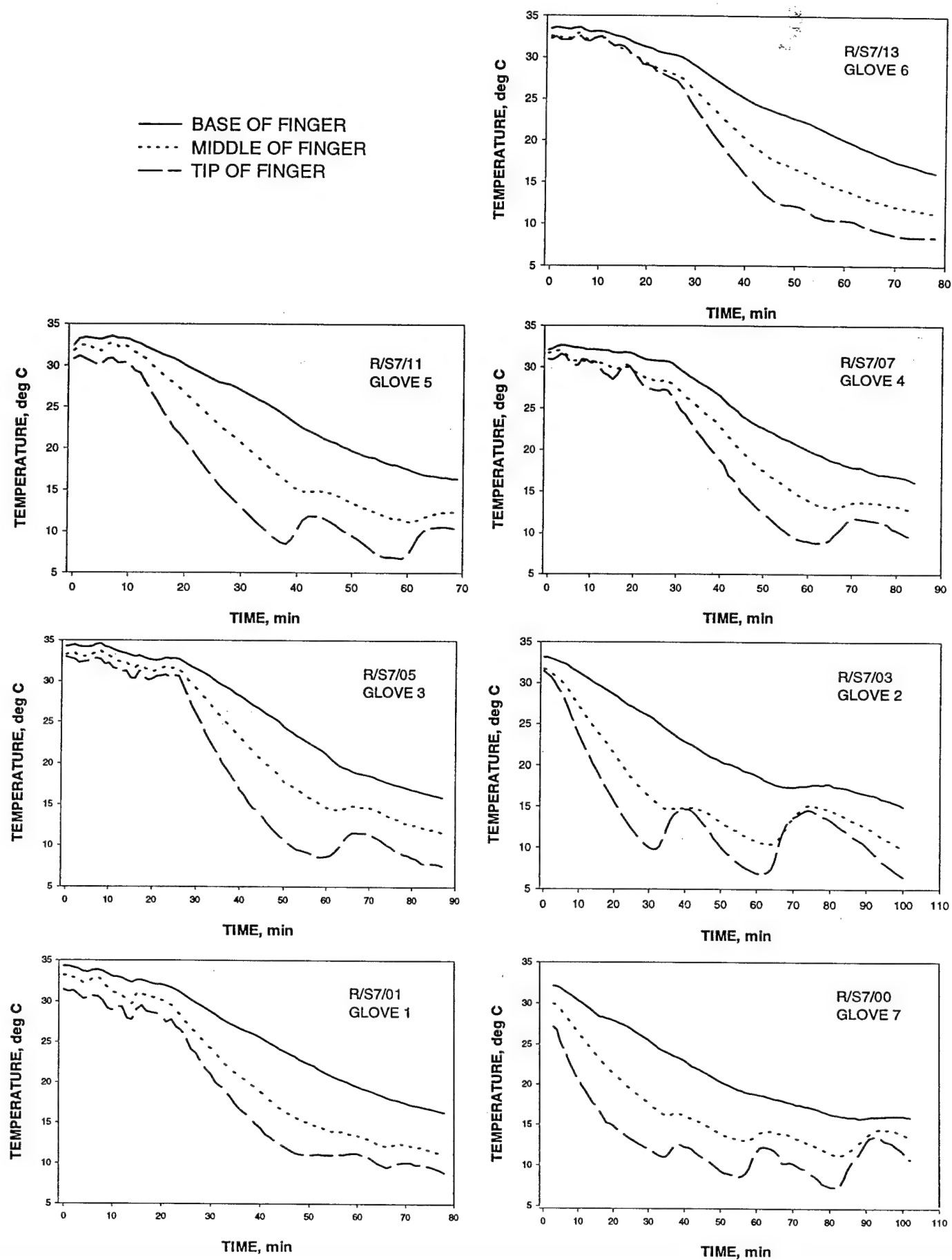


Fig. A.15 Temperature changes of the right middle finger of Subject 7 in the cold-dry condition.

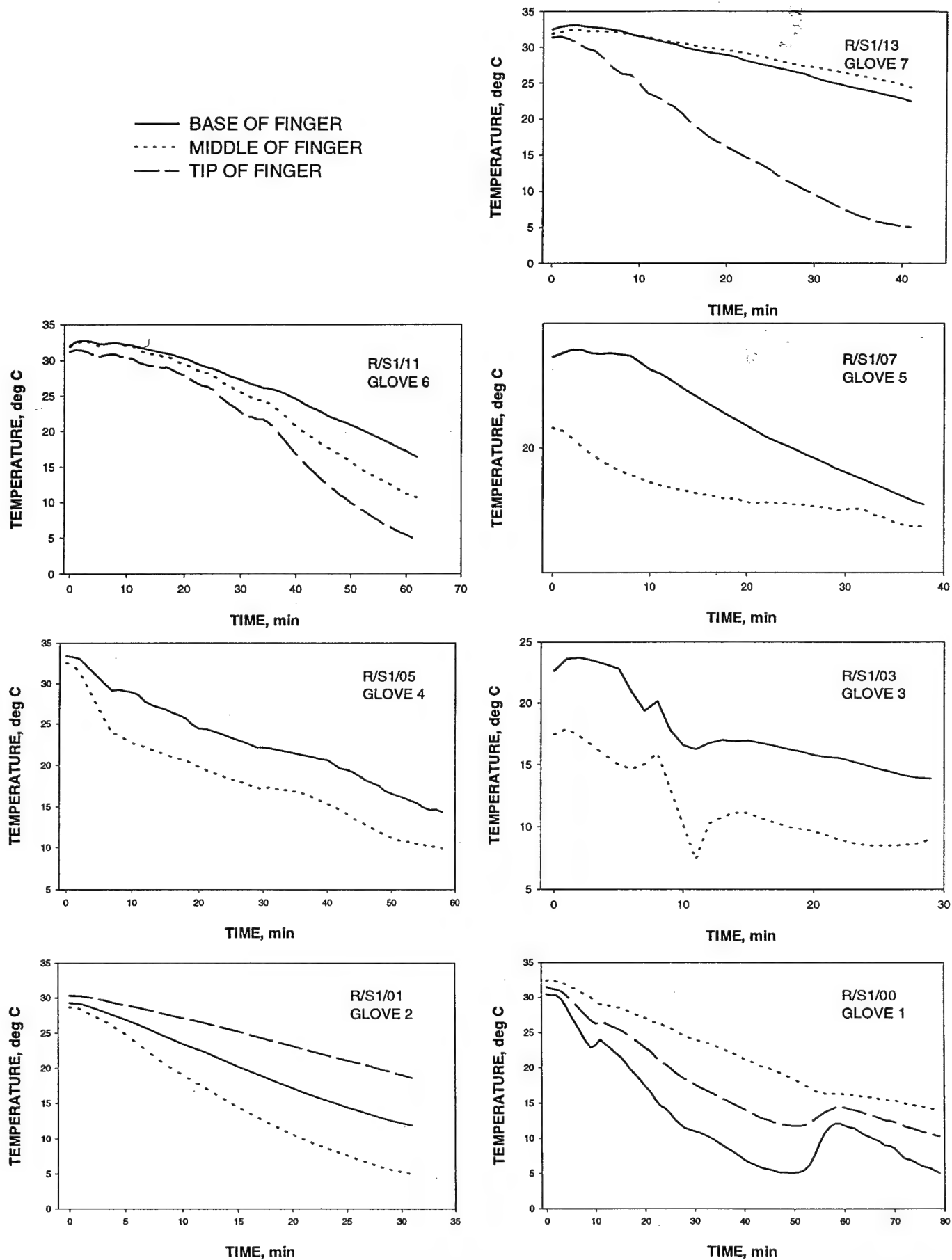


Fig. A.16 Temperature changes of the right middle finger of Subject 8 in the cold-dry condition.

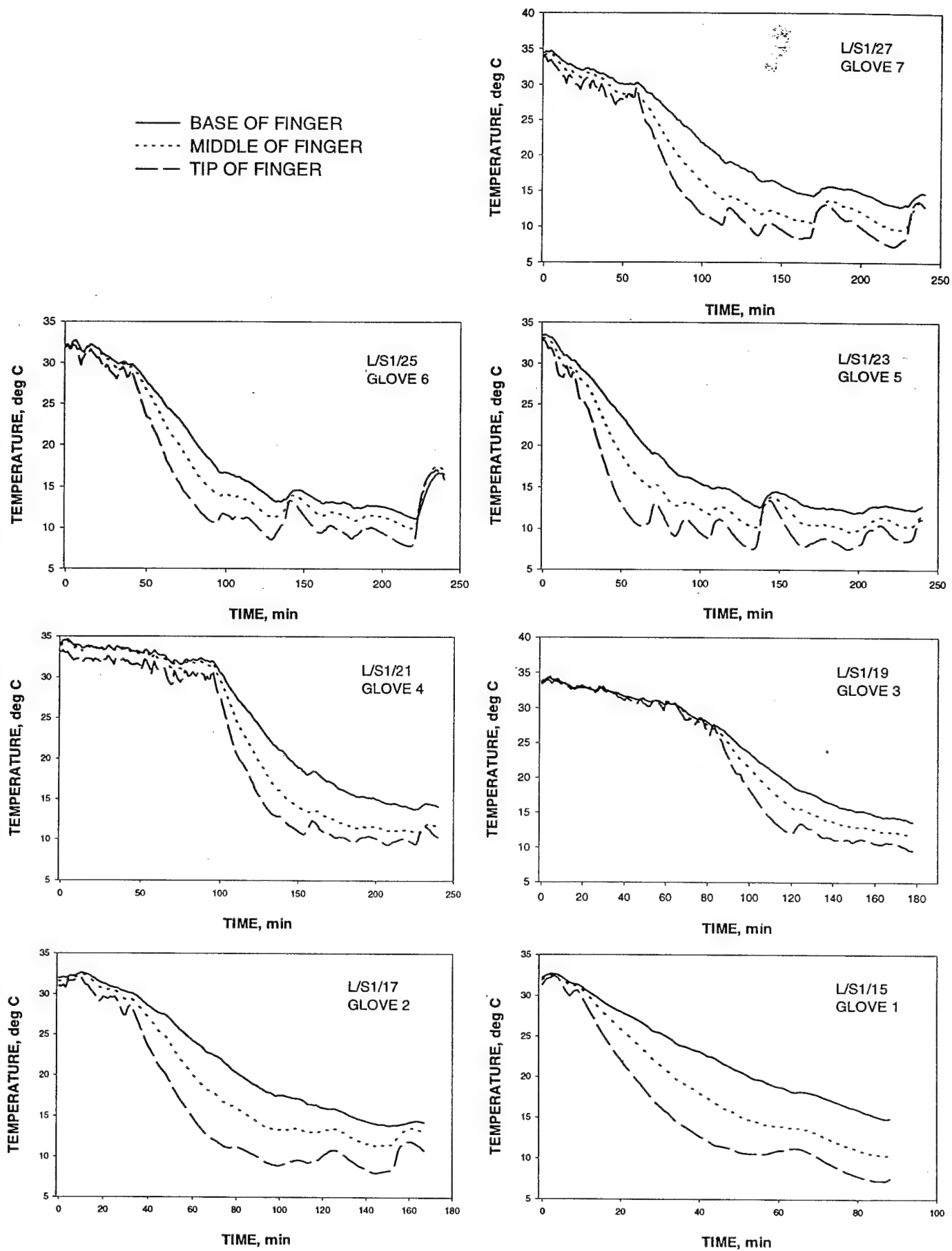


Fig. A.17 Temperature changes of the left middle finger of Subject 1 in the cold-wet condition.

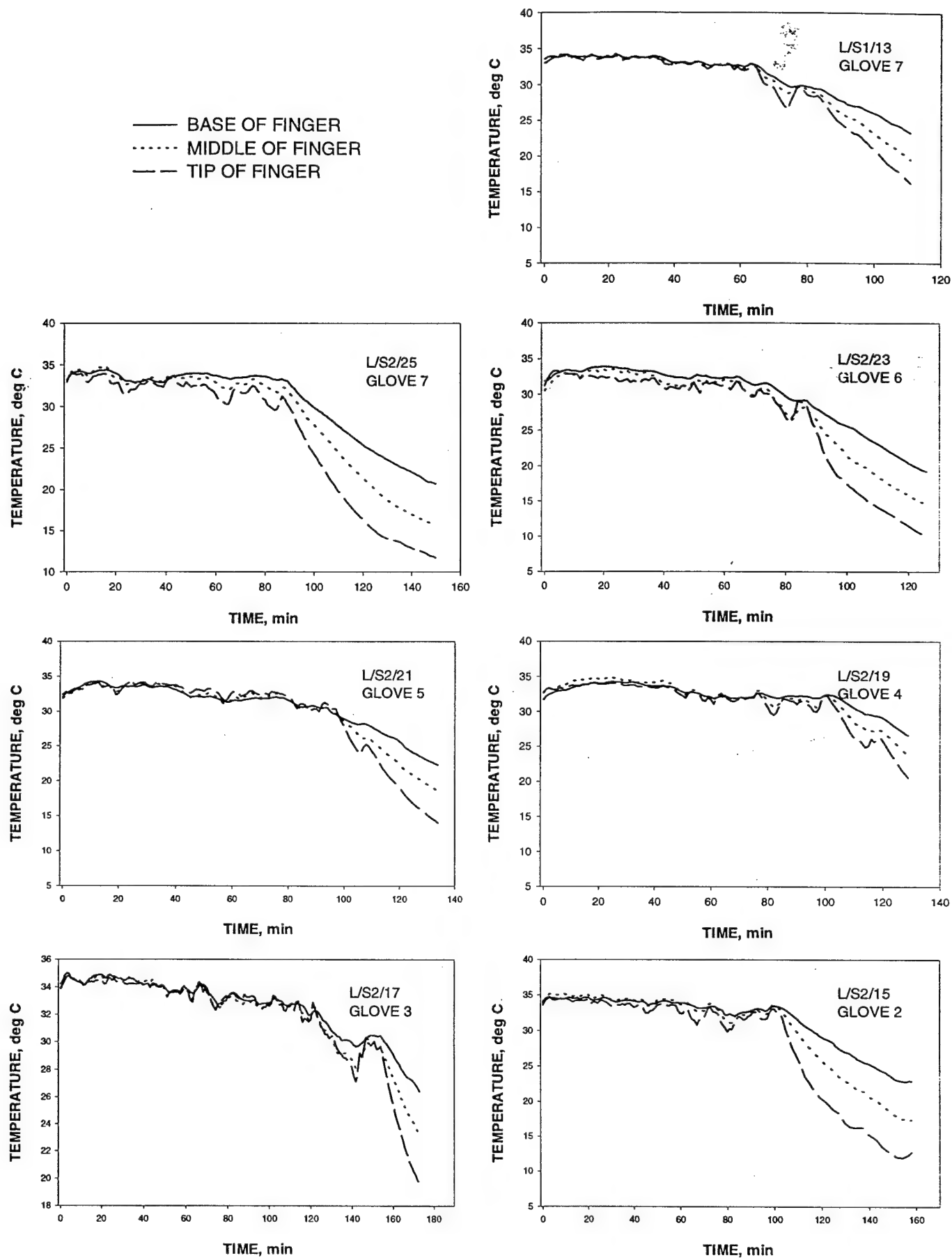


Fig. A.18 Temperature changes of the left middle finger of Subject 2 in the cold-wet condition.

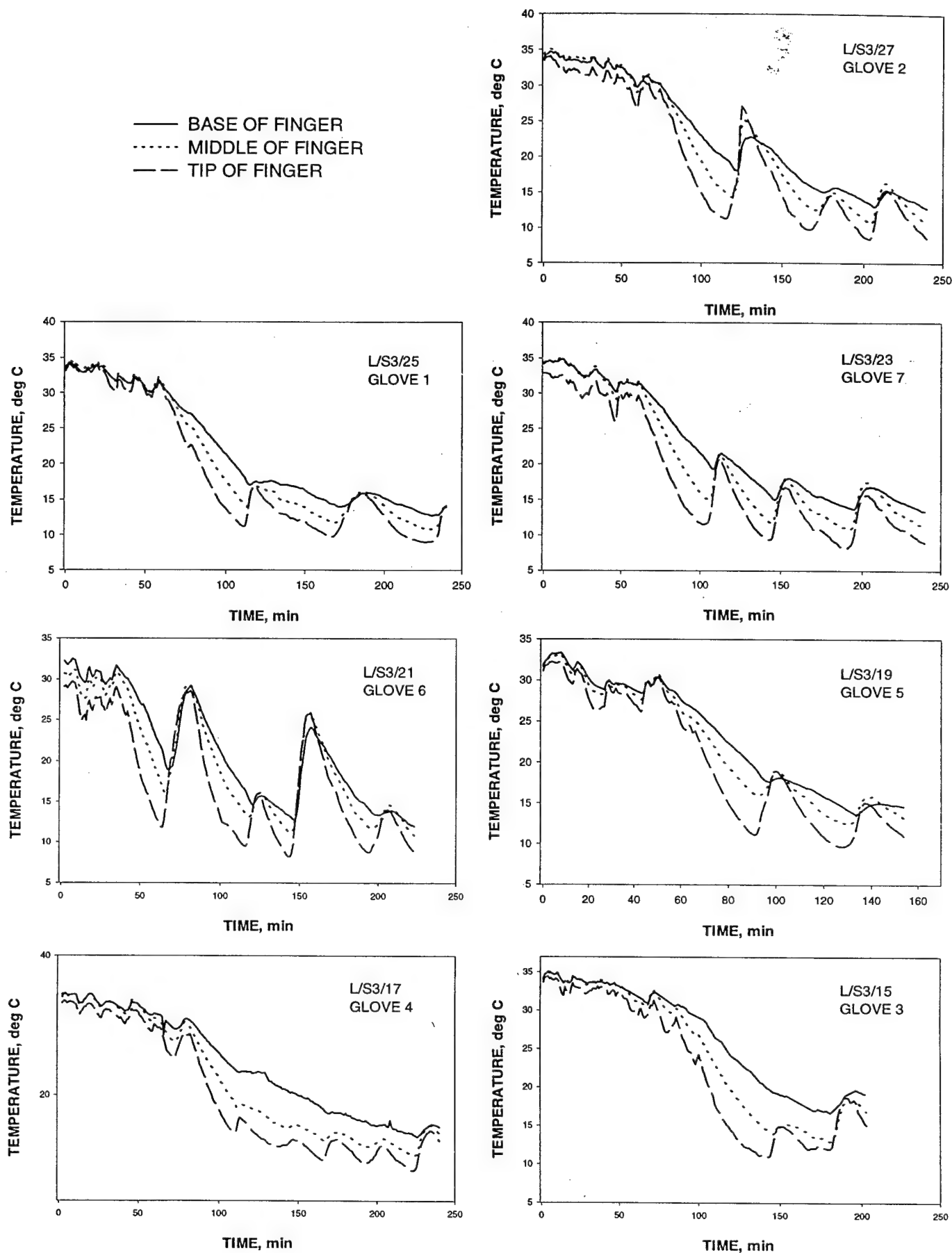


Fig. A.19 Temperature changes of the left middle finger of Subject 3 in the cold-wet condition.

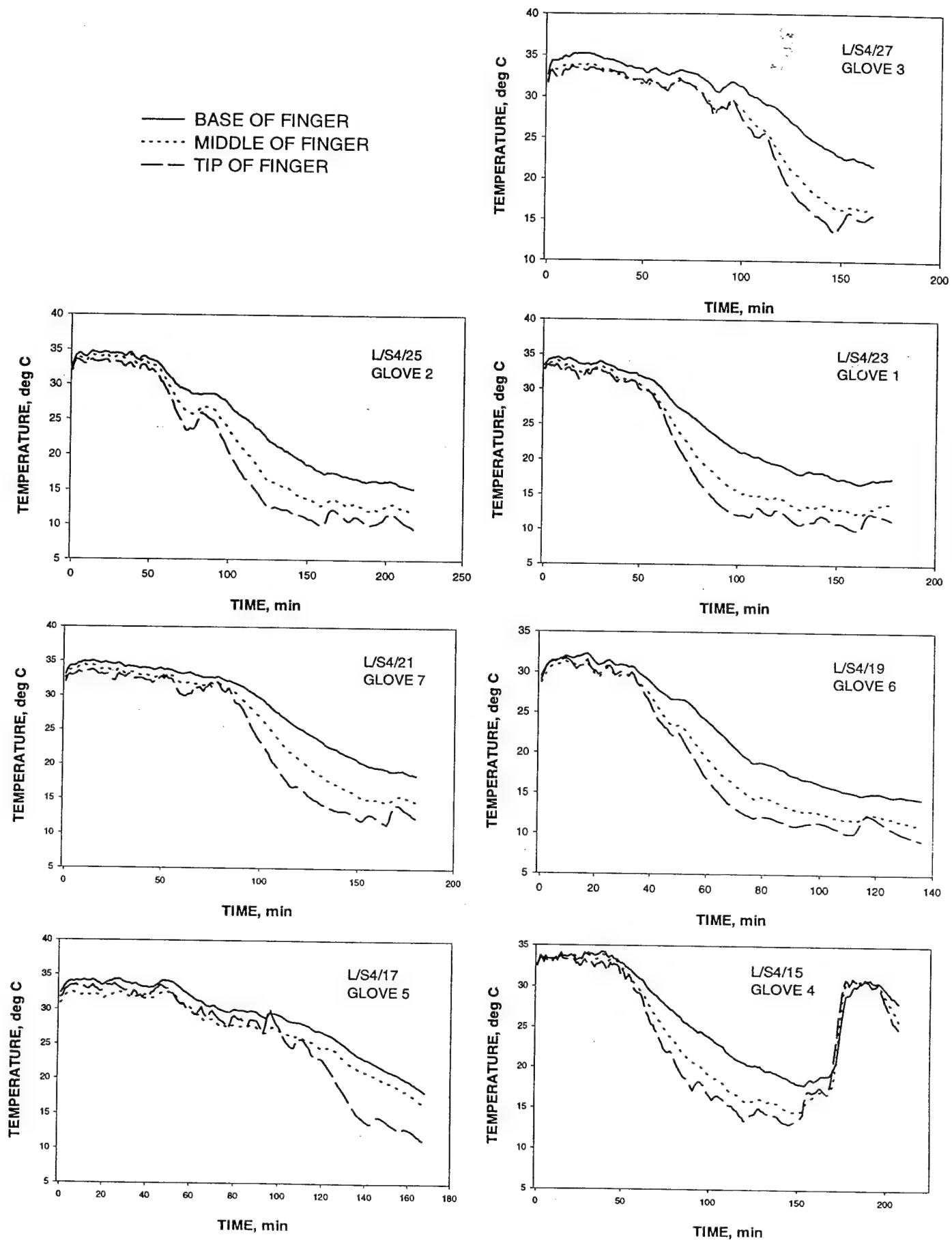


Fig. A.20 Temperature changes of the left middle finger of Subject 4 in the cold-wet condition.

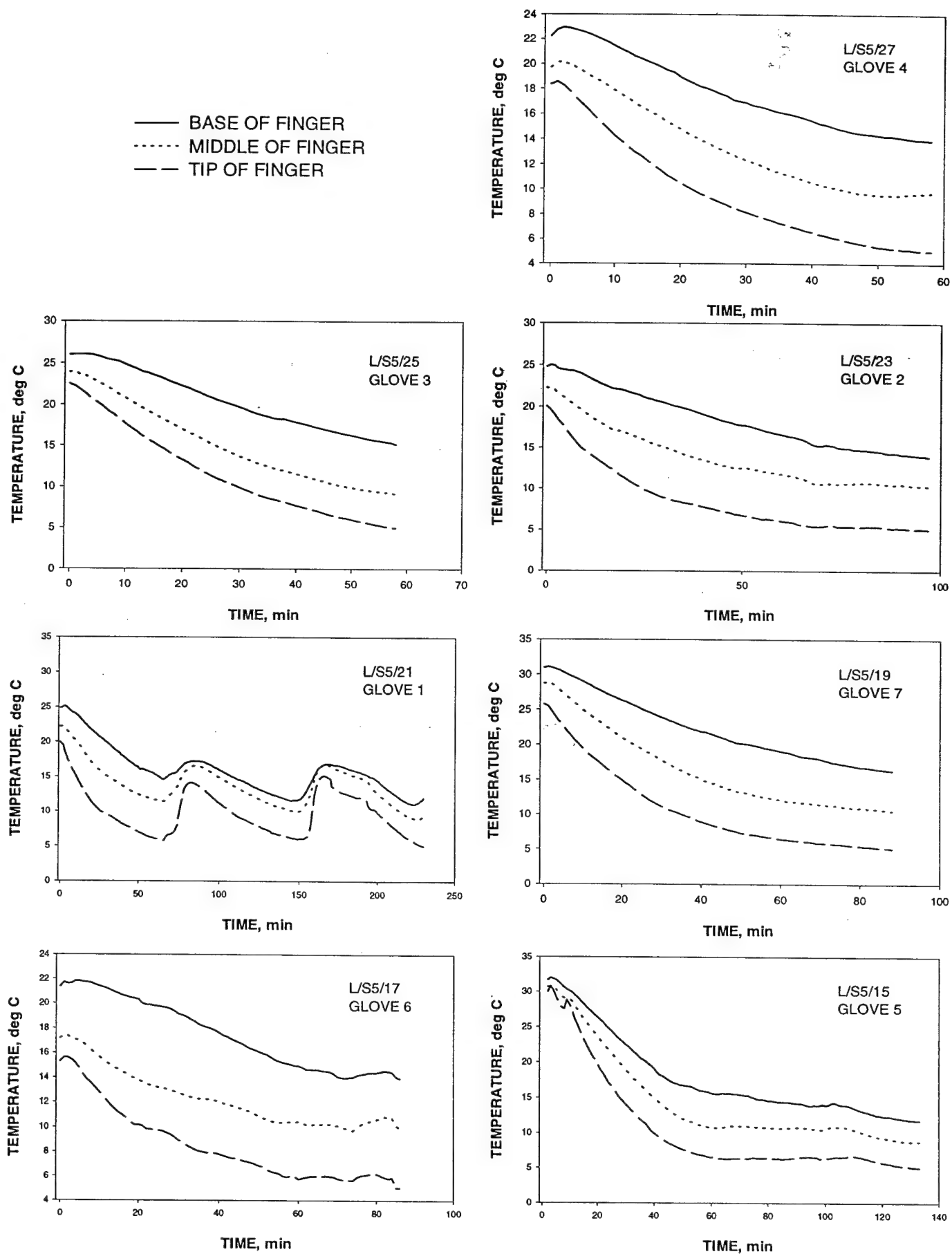


Fig. A.21 Temperature changes of the left middle finger of Subject 5 in the cold-wet condition.

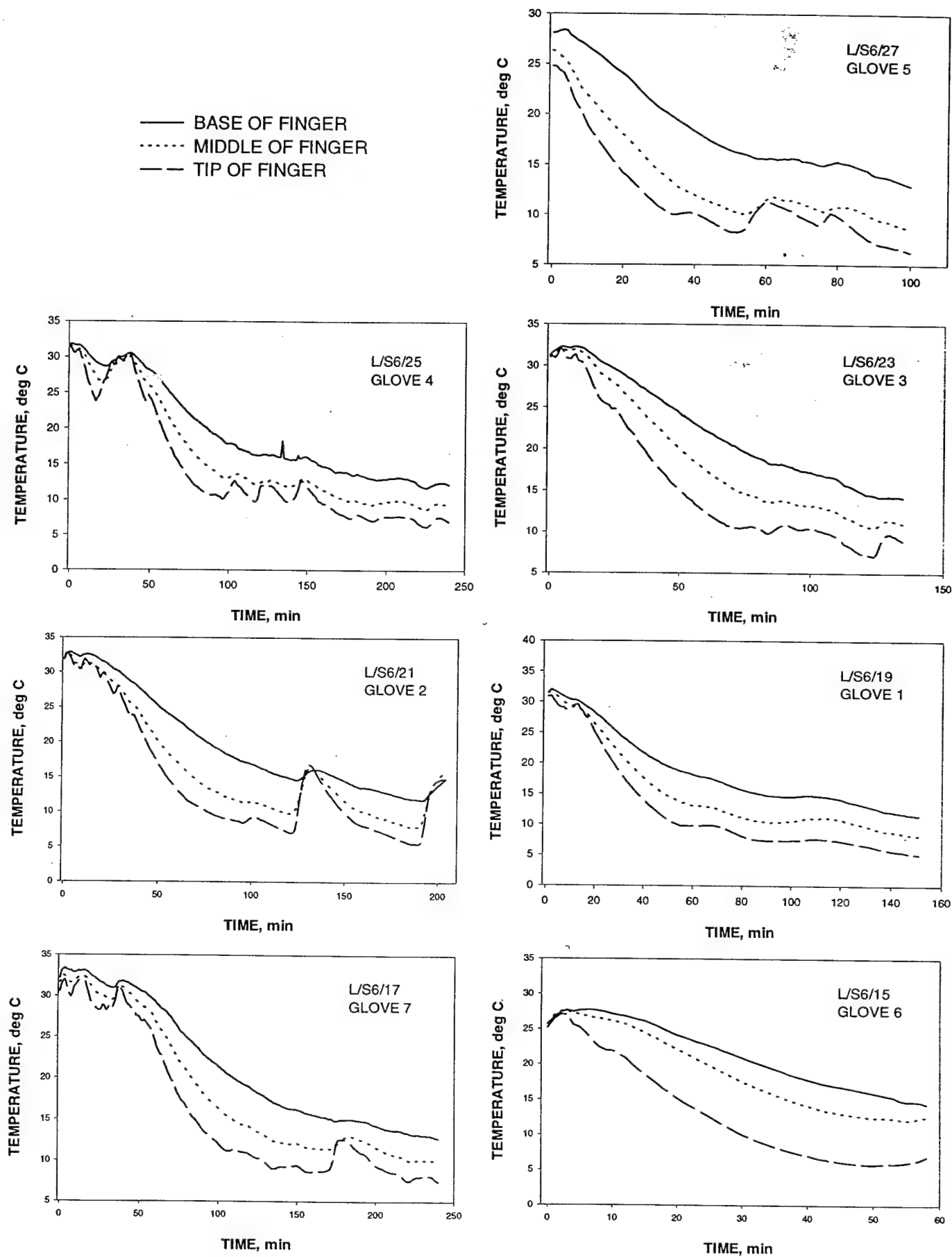


Fig. A.22 Temperature changes of the left middle finger of Subject 6 in the cold-wet condition.

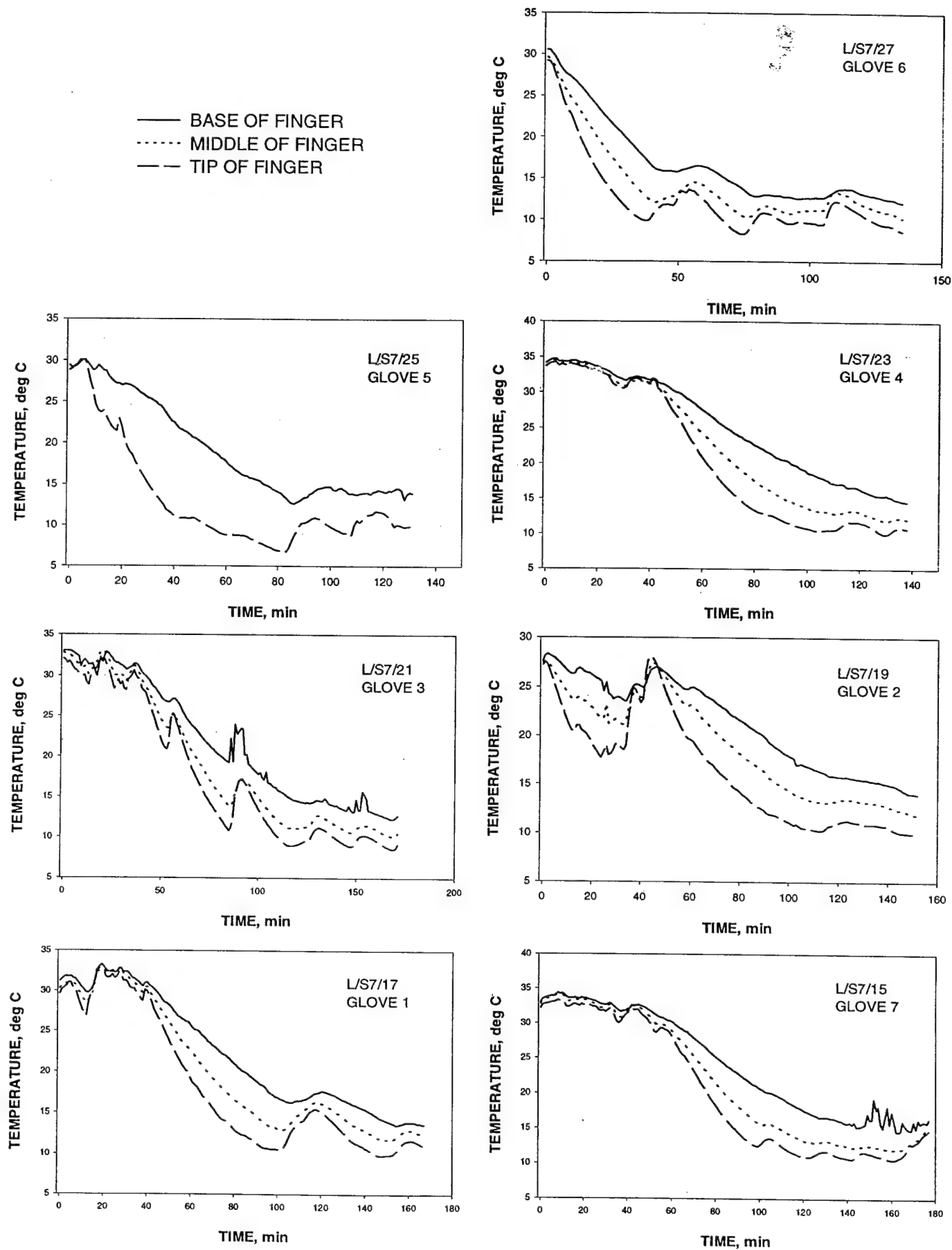


Fig. A.23 Temperature changes of the left middle finger of Subject 7 in the cold-wet condition.

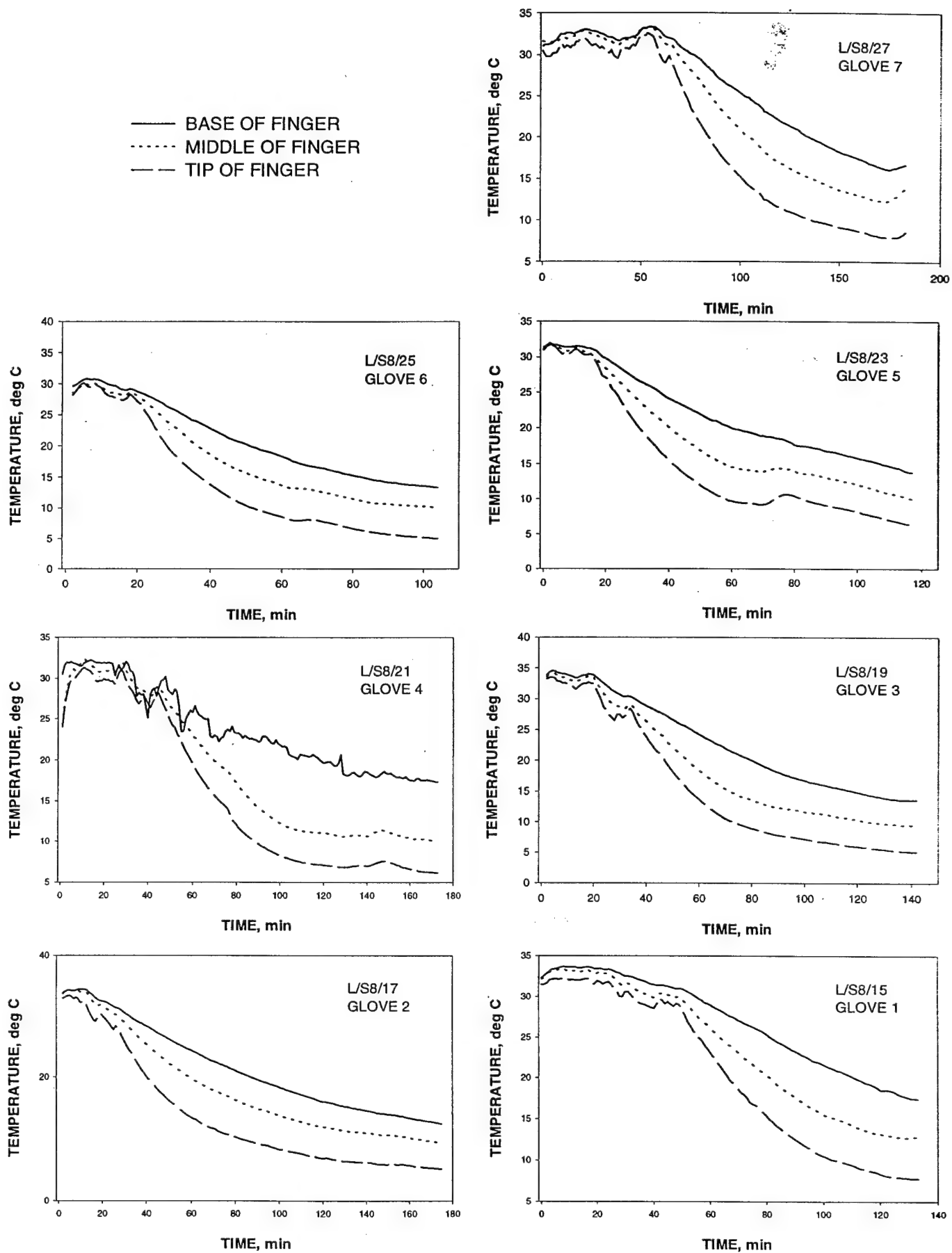


Fig. A.24 Temperature changes of the left middle finger of Subject 8 in the cold-wet condition.

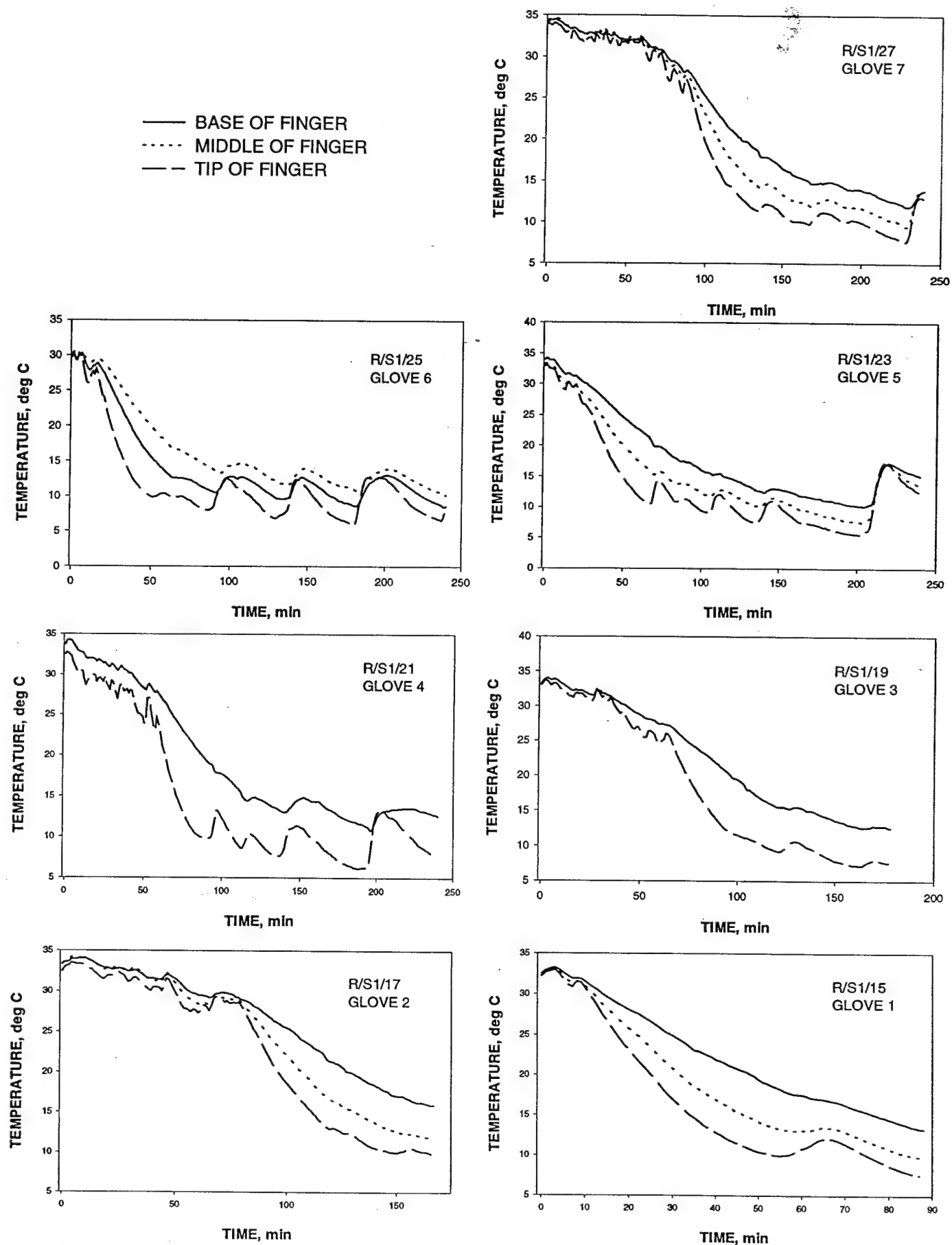


Fig. A.25 Temperature changes of the right middle finger of Subject 1 in the cold-wet condition.

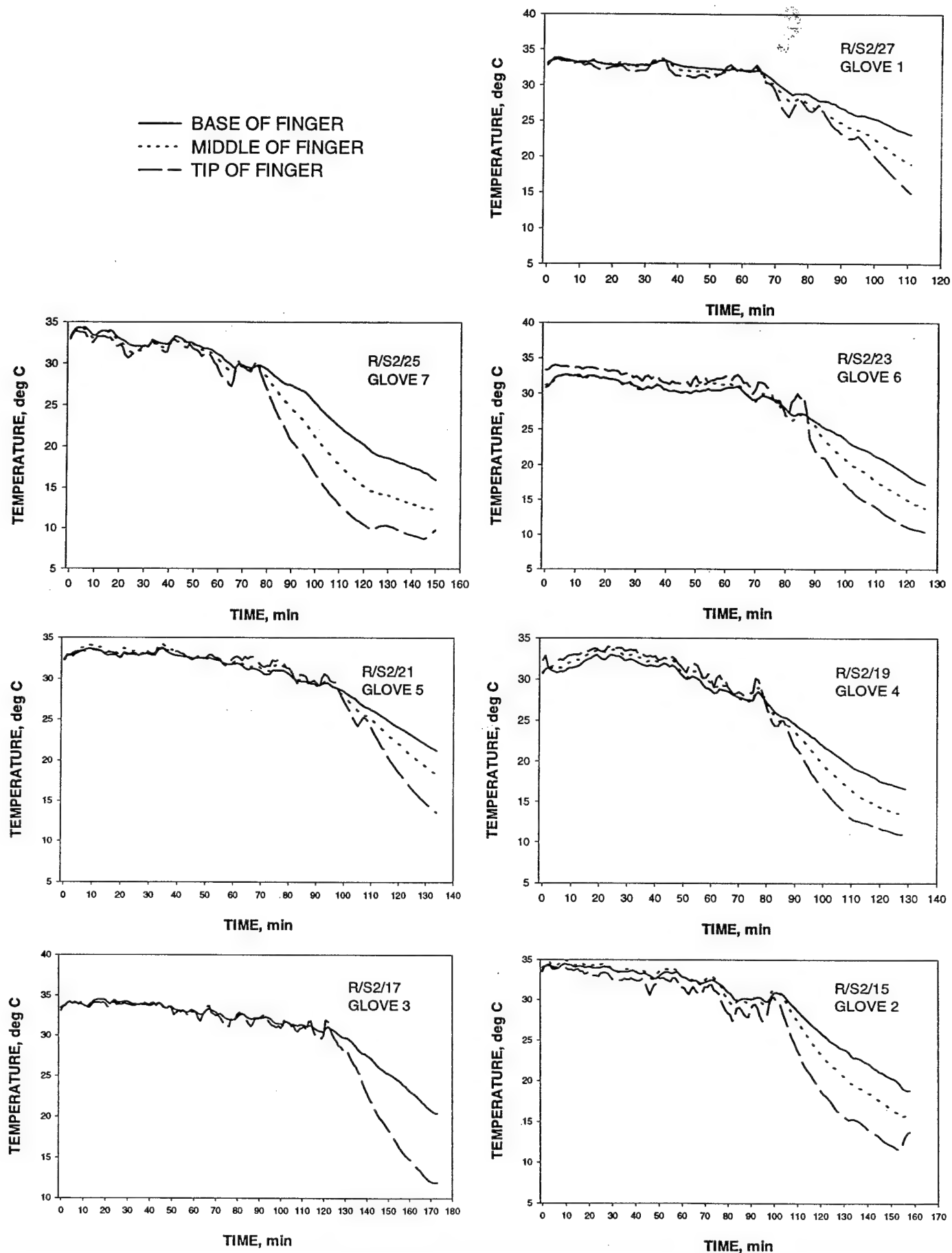


Fig. A.26 Temperature changes of the right middle finger of Subject 2 in the cold-wet condition.

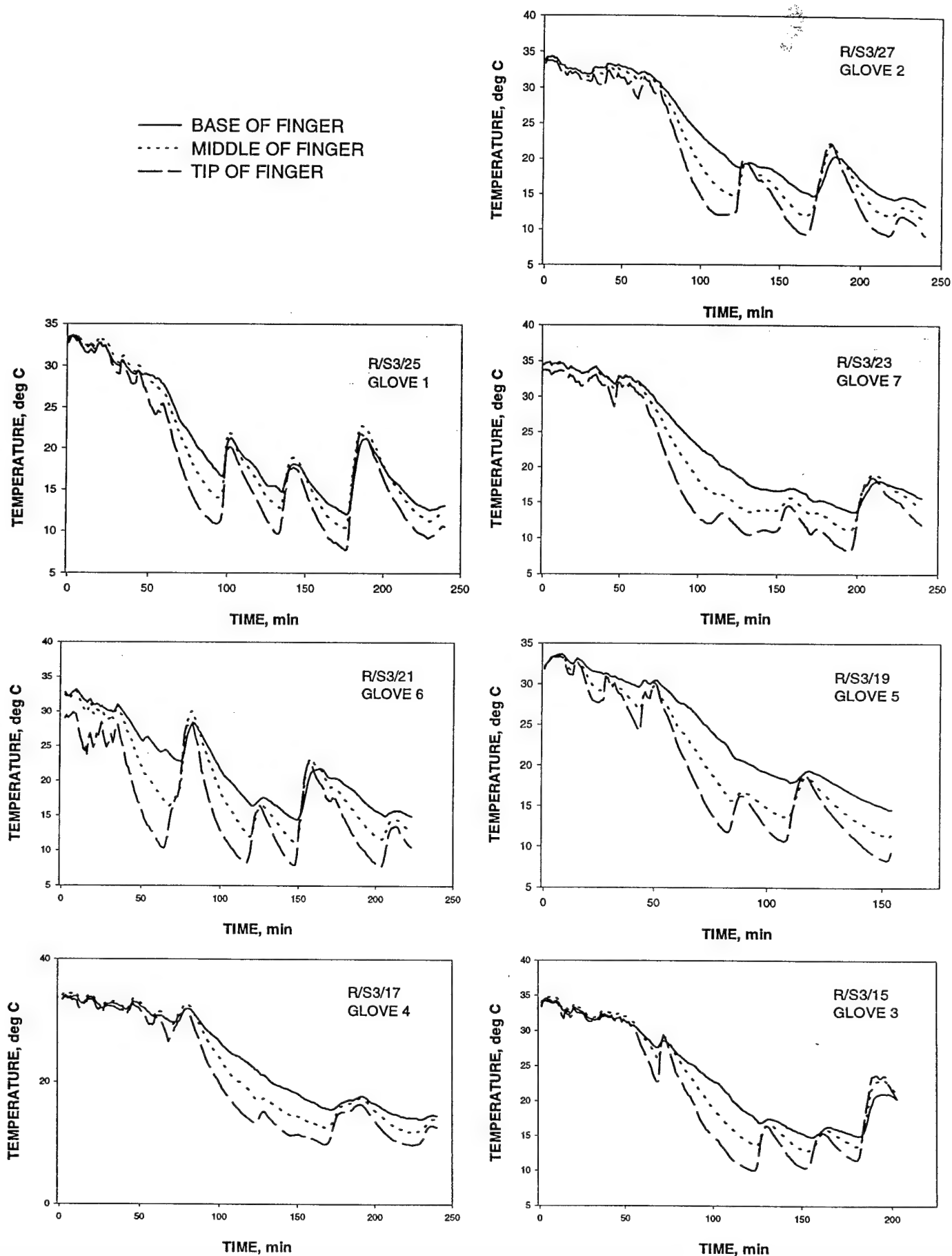


Fig. A.27 Temperature changes of the right middle finger of Subject 3 in the cold-wet condition.

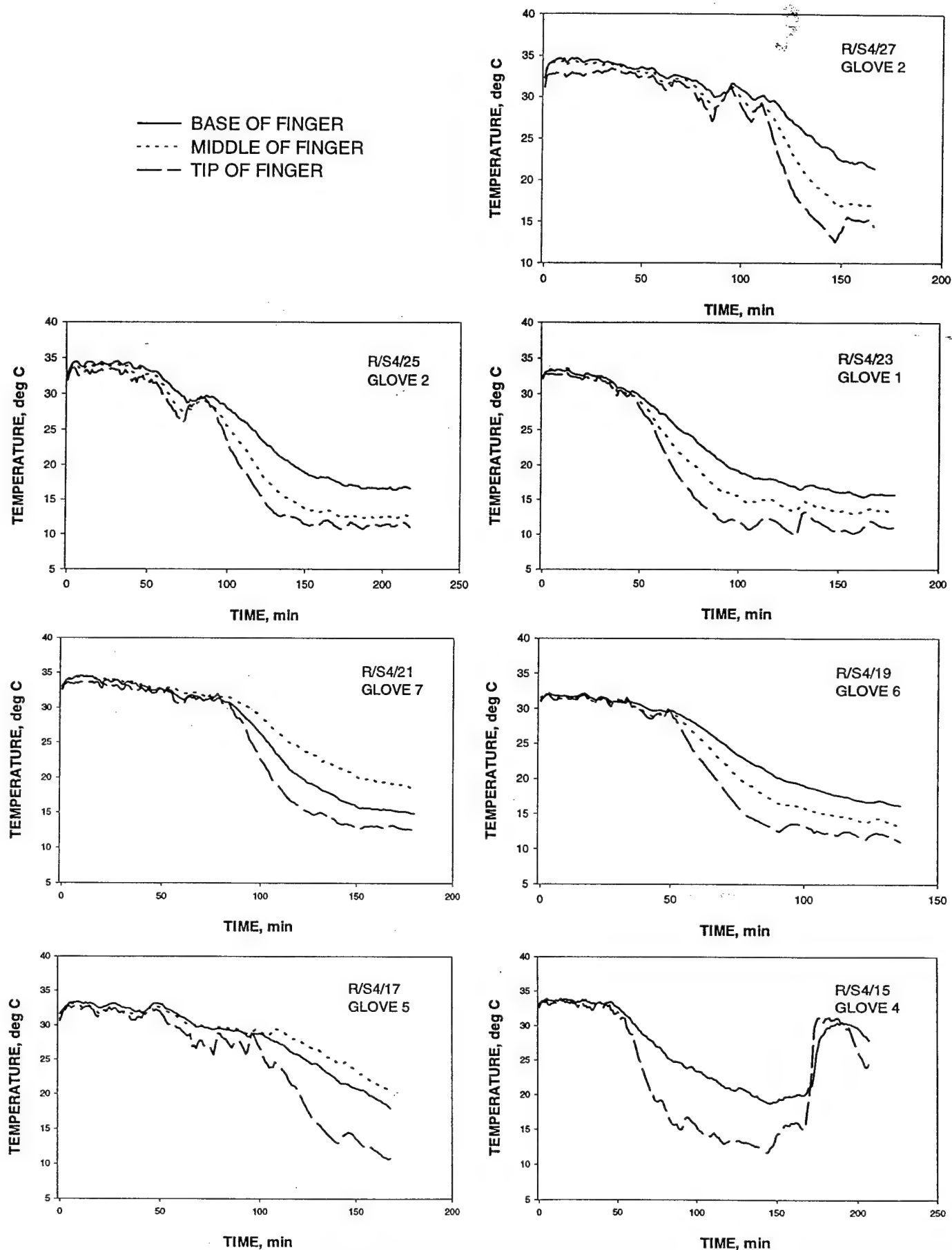


Fig. A.28 Temperature changes of the right middle finger of Subject 4 in the cold-wet condition.

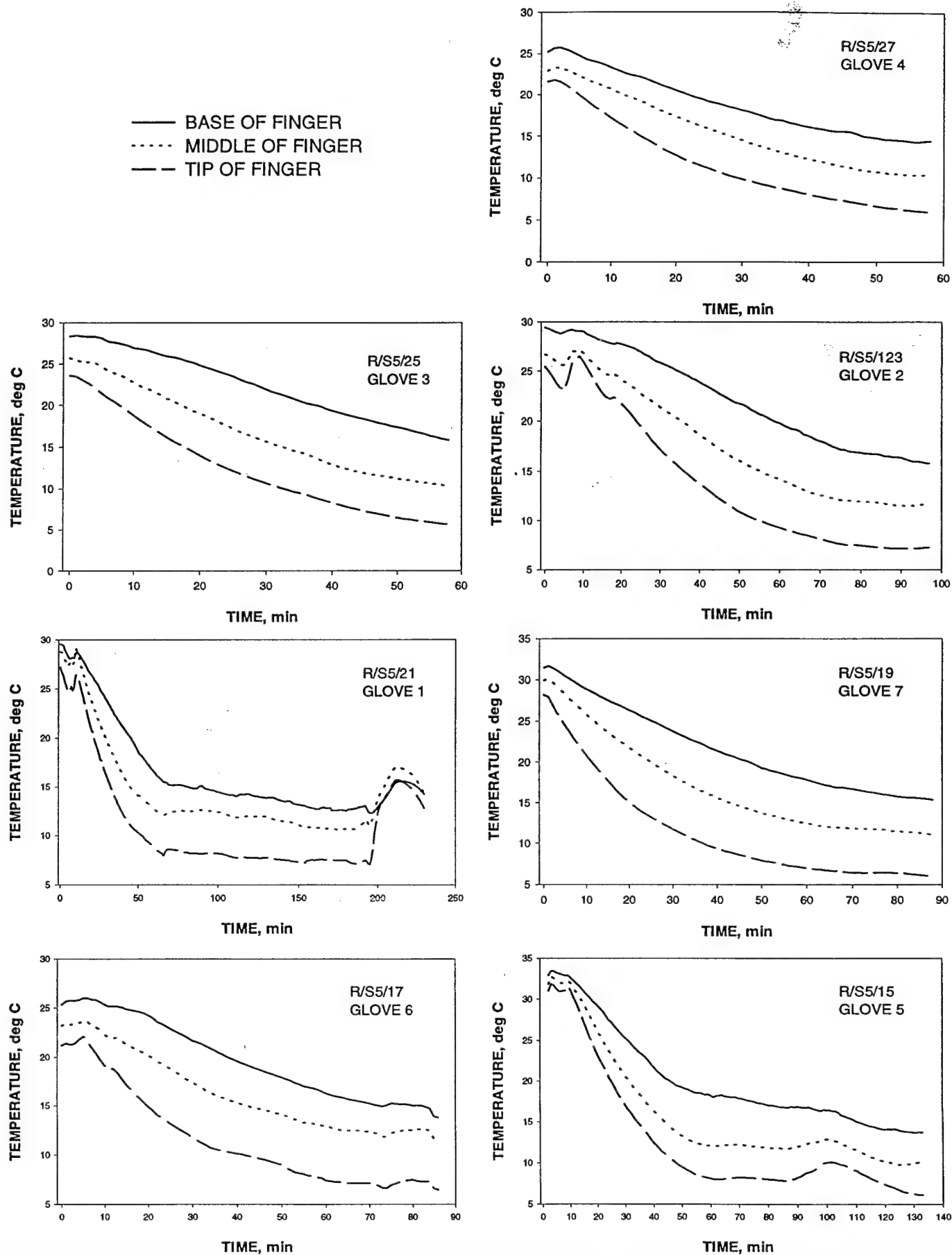


Fig. A.29 Temperature changes of the right middle finger of Subject 5 in the cold-wet condition.

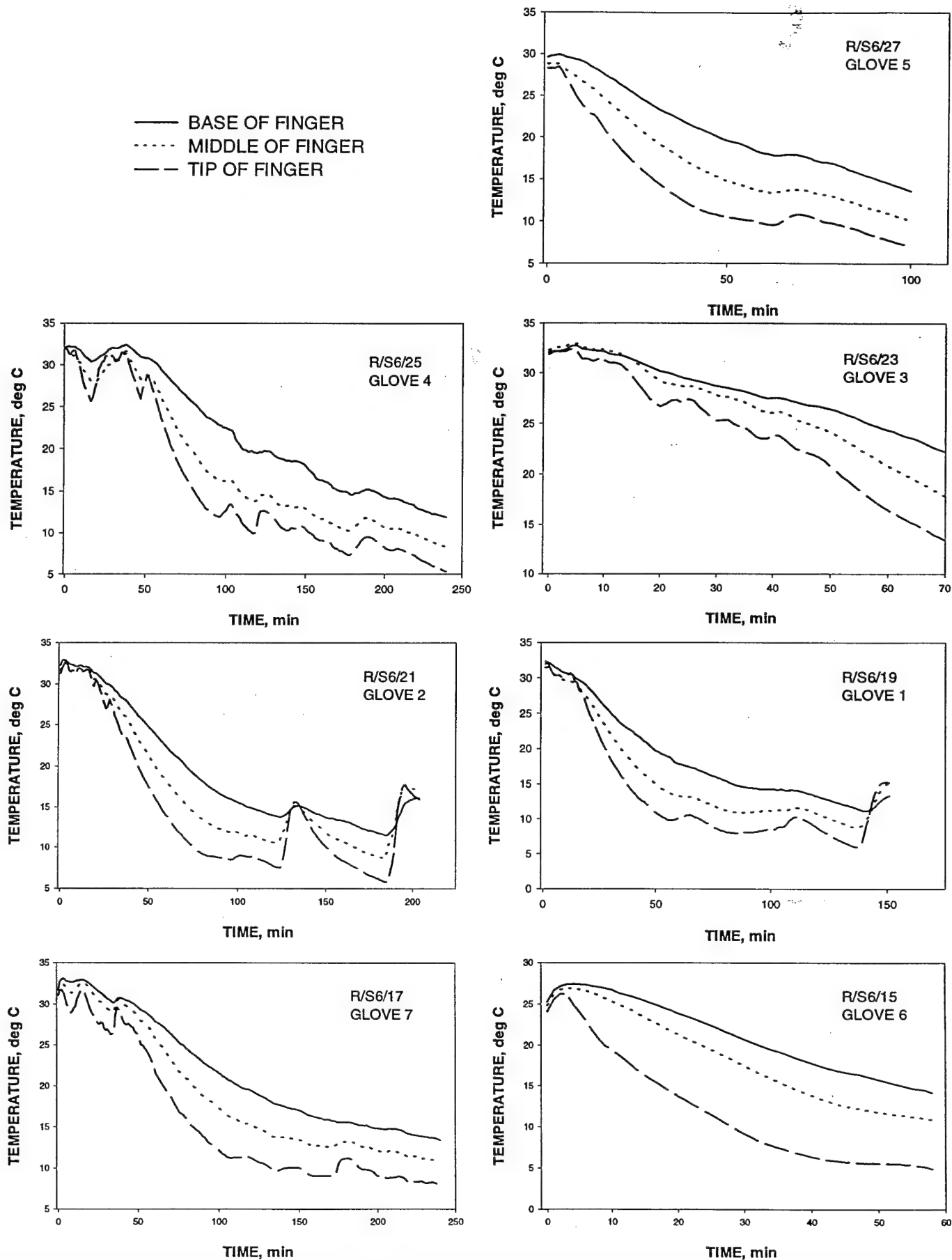


Fig. A.30 Temperature changes of the right middle finger of Subject 6 in the cold-wet condition.

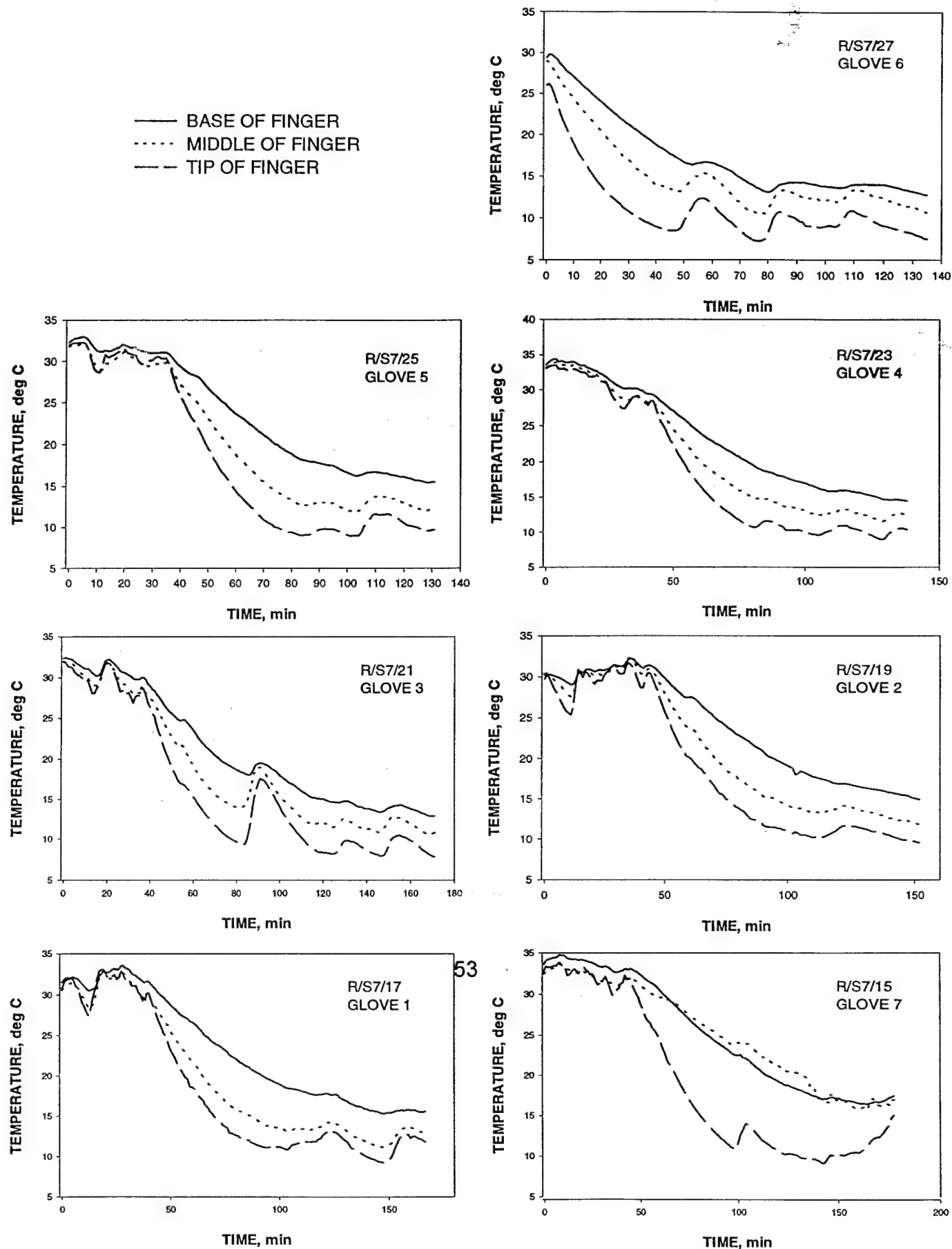


Fig. A.31 Temperature changes of the right middle finger of Subject 7 in the cold-wet condition.

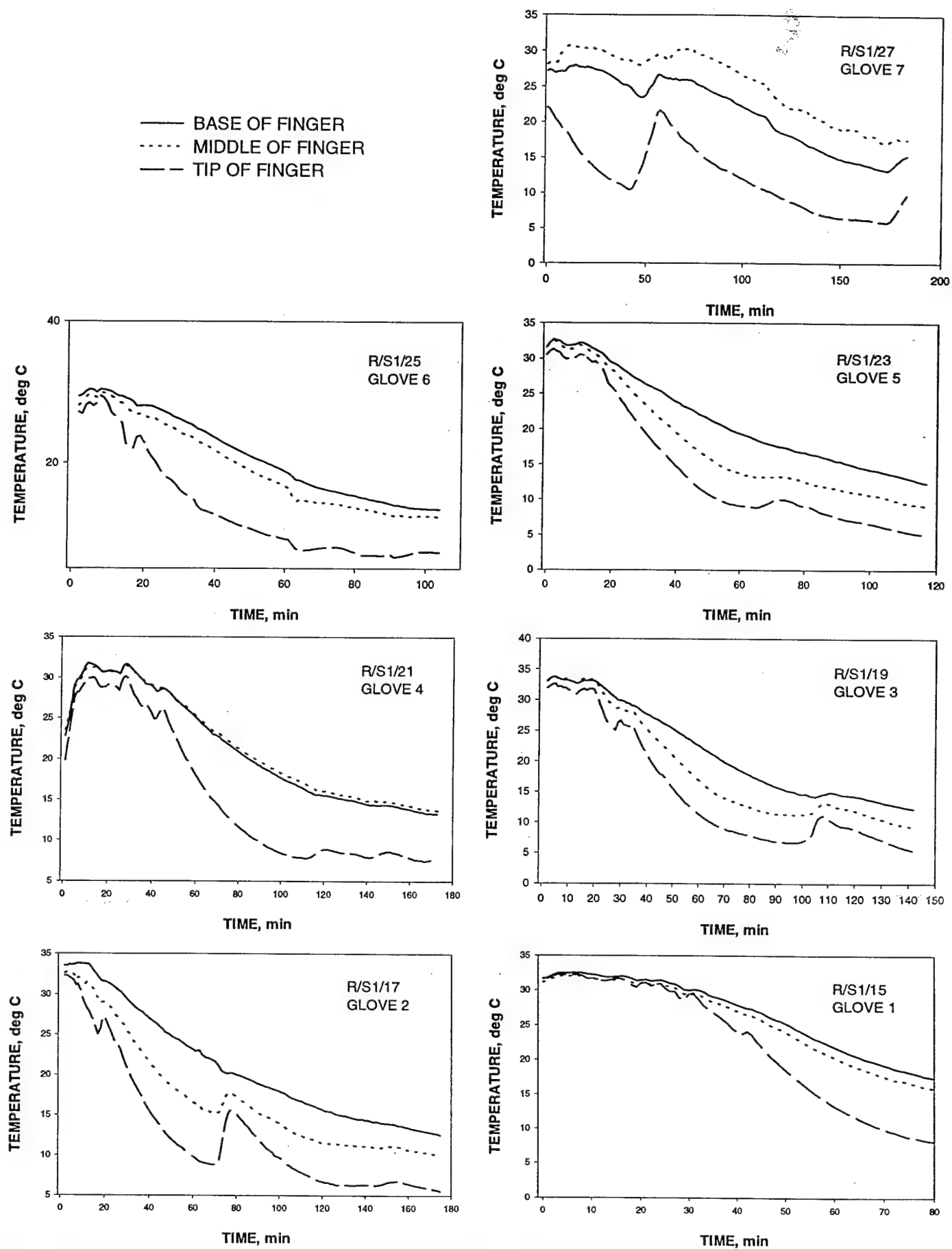


Fig. A.32 Temperature changes of the right middle finger of Subject 8 in the cold-wet condition.

APPENDIX B - Data sheets for all subjects and gloves in the cold-dry and cold-wet conditions

The data sheets are divided for the 3 phases and present various measured and calculated parameters used in the analysis. In the designations on each line, i.e., Si_mn_j Si (i=1 to 8) stands for Subject number; mn (00 to 25, odd numerals only, excluding 09) designates the testing day; and j (1 to 7) indicates glove number. The dominant hand of each subject is indicated by _D following the hand designation.

Table B.1 Data for Subject 1 in the cold-dry condition

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S1_00_1	L	29.43	0	29.43	xxx	0		
	R_D	30.98	0	30.98	xxx	0		
S1_01_2	L	31.3	32	28.18	-0.0975	-3.12		
	R_D	30	7	30.41	0.058571	0.41		
S1_03_3	L	31.89	0	31.89	xxx	0		
	R_D	31.96	0	31.96	xxx	0		
S1_05_4	L	31.4	20	27.22	-0.209	-4.18		
	R_D	32.48	18	28.53	-0.21944	-3.95		
S1_07_5	L	31.6	11	30.39	-0.11	-1.21		
	R_D	32.57	11	31.61	-0.08727	-0.96		
S1_11_6	L	30.47	0	30.47	xxx	0		
	R_D	31.73	5	30.8	-0.186	-0.93		
S1_13_7	L	32.17	2	32.64	0.235	0.47		
	R_D	32.23	2	32.43	0.1	0.2		
	mean	31.38308	8.153846	30.34692	-0.07696	-1.03615		
	std. dev.	0.935839	9.762003	1.643358	0.156032	1.615093		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S1_00_1	L	44	7.1	44	31.32	55	65	10
	R_D	41	7.44	41	29.39	54	65	11
S1_01_2	L	57	11.97	25	27.1	80	64	-16
	R_D	46	10.42	39	35.08	70	64	-6
S1_03_3	L	53	9.05	53	37.75	72	54	-18
	R_D	52	9.09	52	34.86	66	54	-12
S1_05_4	L	71	7.3	51	34.18	76	71	-5
	R_D	70	6.32	52	31.44	73	71	-2
S1_07_5	L	34	10.61	23	24.26	55	92	37
	R_D	49	10.81	38	42.9	91	92	1
S1_11_6	L	35	7.74	35	25.17	48	35	-13
	R_D	34	10.53	29	27.23	56	35	-21
S1_13_7	L	38	9.48	36	28.24	57	61	4
	R_D	38	9.07	36	28.19	57	61	4
	mean	48	9.066154	39.84615	31.45538	65.61538	63.30769	-2.30769
	std. dev.	12.27523	1.685552	9.959258	5.228481	12.3413	16.54298	15.12439
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S1_00_1		S1_01_2		S1_03_3		S1_05_4	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	53	48	60	52				
final temp	9.02	11.43	12.67	11.09				
delta	1.92	3.99	0.7	0.67				
final time	66	65	65	64				
final temp	4.97	6.07	11.78	8.55				
delta	-4.05	-5.36	-0.89	-2.54				
final time								

Table B.1 Data for Subject 1 in the cold-dry condition

final temp								
delta								
final time								
final temp								
delta								
	S1_07_5		S1_11_6		S1_13_7			
	L	R_D	L	R_D	L	R_D		
final time	39	54			44	44		
final temp	13.16	12.29			13.53	13.27		
delta	2.55	1.48			4.05	4.2		
final time	51	76			61	60		
final temp	7.56	6.86			6.47	6.85		
delta	-5.6	-5.43			-7.06	-6.42		
final time	58	87						
final temp	10.77	8.48						
delta	3.21	1.62						
final time	72	91						
final temp	7.13	7.88						
delta	-3.64	-0.6						
final time	78							
final temp	8.09							
delta	0.96							
final time	85							
final temp	7.3							
delta	-0.79							
final time	92							
final temp	7.91							
delta	0.61							

Table B.2 Data for Subject 2 in the cold-dry condition

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S2_00_2	L	33.06	33	31.1	-0.05939	-1.96		
	R_D	32.85	33	31.02	-0.05545	-1.83		
S2_01_3	L	33.06	24	32.57	-0.02042	-0.49		
	R_D	32.85	30	30.85	-0.06667	-2		
S2_03_4	L	33.09	34	30.68	-0.07088	-2.41		
	R_D	33.35	34	30.76	-0.07618	-2.59		
S2_05_5	L	31.64	29	31.69	0.001724	0.05		
	R_D	32.01	30	30.31	-0.05667	-1.7		
S2_07_6	L	32.27	46	30.36	-0.04152	-1.91		
	R_D	32.93	46	31.62	-0.02848	-1.31		
S2_11_7	L	33.45	67	28.86	-0.06851	-4.59		
	R_D	33.84	66	30.07	-0.05712	-3.77		
S2_13_1	L	33.02	56	30.85	-0.03875	-2.17		
	R_D	32.48	57	29.55	-0.0514	-2.93		
	mean	32.85	41.78571	30.735	-0.04927	-2.115		
	std.dev.	0.582712	14.47639	0.919463	0.02177	1.181692		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S2_00_2	L	88	6.98	55	37.1	94	88	6
	R_D	87	7.28	54	38.95	96	88	8
S2_01_3	L	82	7.61	58	38.38	101	82	19
	R_D	71	9.07	41	32.5	91	82	9
S2_03_4	L	83	8.65	49	34.96	100	83	17
	R_D	82	9.41	48	38.26	105	83	22
S2_05_5	L	72	7.65	43	31.4	90	72	18
	R_D	71	8.74	41	29.78	84	72	12
S2_07_6	L	83	14.36	37	62.03	160	83	77
	R_D	82	13.11	36	50.03	140	83	57
S2_11_7	L	85	16.67	18	32.95	125	85	40
	R_D	84	19.35	18	42.58	142	85	57
S2_13_1	L	95	8.74	39	32.39	117	95	22
	R_D	94	9.1	37	31.45	113	95	18
	mean	82.78571	10.48	41	38.05429	111.2857	84	27.28571
	std. dev.	7.454256	3.844493	12.05755	8.750906	22.83529	6.656402	21.82951
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
sb_dy_gl	S2_00_2		S2_01_3		S2_03_4		S2_05_5	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time				75				
final temp				9.87				
delta				0.8				
final time				81				
final temp				8.24				
delta				-1.63				

Table B.2 Data for Subject 2 in the cold-dry condition

final time							
final temp							
delta							
final time							
final temp							
delta							
	S2_07_6		S2_11_7		S2_13_1		
	L	R_D	L	R_D	L	R_D	
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							

Talble B.3 Data for Subject 3 in the cold-dry condition

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S3_00_3	L_D	30.13	0	30.13	xxx	0		
	R	30.67	0	30.67	xxx	0		
S3_01_4	L_D	29.43	0	29.43	xxx	0		
	R	30.32	0	30.32	xxx	0		
S3_03_5	L_D	32.44	8	30.44	-0.25	-2		
	R	32.02	8	30.52	-0.1875	-1.5		
S3_05_6	L_D	32.68	27	28.68	-0.14815	-4		
	R	32.77	27	29.79	-0.11037	-2.98		
S3_07_7	L_D	33	21	29.72	-0.15619	-3.28		
	R	33.2	28	29.3	-0.13929	-3.9		
S3_11_1	L_D	33.57	30	29.72	-0.12833	-3.85		
	R	33.39	23	31.67	-0.07478	-1.72		
S3_13_2	L_D	32.29	39	26.89	-0.13846	-5.4		
	R	32.82	30	28.96	-0.12867	-3.86		
	mean	32.05214	17.21429	29.73143	-0.14617	-2.32071		
	std.dev.	1.344443	13.90174	1.120548	0.046788	1.830076		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S3_00_3	L_D	xxx	xxx	xxx	xxx	xxx	xxx	xxx
	R	25	13.14	25	30.32	55	100	45
S3_01_4	L_D	25	11.57	25	26.05	47	111	64
	R	27	10.8	27	27.6	51	111	60
S3_03_5	L_D	35	8.33	27	23.99	54	89	35
	R	33	9.46	25	22.39	50	89	39
S3_05_6	L_D	50	10.42	23	21.96	66	108	42
	R	51	9.67	24	20.4	64	108	44
S3_07_7	L_D	52	8.98	31	26.88	71	123	52
	R	62	9.27	34	30.01	84	123	39
S3_11_1	L_D	59	10.78	29	28.51	83	109	26
	R	60	9.06	37	32.05	85	109	24
S3_13_2	L_D	64	8.49	25	20.95	75	106	31
	R	67	6.68	37	25.41	77	106	29
	mean	46.92308	9.742308	28.38462	25.88615	66.30769	107.0769	40.76923
	std. dev.	15.77161	1.628773	4.874055	3.779527	13.87675	10.21813	12.37709
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
sb_dy_gl	S3_00_3		S3_01_4		S3_03_5		S3_05_6	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time	xxx	30	32	33	42	40	55	57
final temp	xxx	14.15	23.91	18.73	17.62	16.37	12.8	12.61
delta	xxx	1.01	12.34	7.93	9.29	6.91	2.38	2.94
final time	xxx	42	54	53	59	56	68	71
final temp	xxx	11	8.69	6.9	6.02	6.31	7.92	7.18
delta	xxx	-3.15	-15.22	-11.83	-11.6	-10.06	-4.88	-5.43

Table B.3 Data for Subject 3 in the cold-dry condition

final time	xxx	49	62	62	68	64	75	78
final temp	xxx	15.18	15.79	21.7	17.4	15.96	18.89	17.79
delta	xxx	4.18	7.1	14.8	11.38	9.65	10.97	10.61
final time	xxx	65	80	88	88	86	93	98
final temp	xxx	9.12	6.19	5.69	5.17	5.54	7.91	8.37
delta	xxx	-6.06	-9.6	-16.01	-12.23	-10.42	-10.98	-9.42
final time	xxx	74	87	97	89	88	101	104
final temp	xxx	14.21	13.63	15.73	5.89	7.26	17.11	13.49
delta	xxx	5.09	7.44	10.04	0.72	1.72	9.2	5.12
final time	xxx	92	105	110			108	107
final temp	xxx	9.13	7.66	10.48			13.1	13.02
delta	xxx	-5.08	-5.97	-5.25			-4.01	-0.47
final time	xxx	99	111					
final temp	xxx	13.03	12.84					
delta	xxx	3.9	5.18					
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
	S3_07_7		S3_11_1		S3_13_2			
	L	R	L	R	L	R		
final time	59	70	66	67	70	75		
final temp	16.61	15.55	16.77	20.58	17.25	18.32		
delta	7.63	6.28	5.99	11.52	8.76	11.64		
final time	75	85	83	88	89	95		
final temp	7.16	9.44	8.42	8.05	6	8.27		
delta	-9.45	-6.11	-8.35	-12.53	-11.25	-10.05		
final time	85	93	91	96	96	103		
final temp	18.74	12.17	19.55	17.22	19.18	10.71		
delta	11.58	2.73	11.13	9.17	13.18	2.44		
final time	108	109	109	108	106	105		
final temp	6.06	7.34	9.95	10.02	13.3	10.58		
delta	-12.68	-4.83	-9.6	-7.2	-5.88	-0.13		
final time	116	122						
final temp	14.47	17.14						
delta	8.41	9.8						
final time	123							
final temp	12.22							
delta	-2.25							
final time								
final temp								
delta								
final time								
final temp								
delta								

Table B.4 Data for Subject 4 in the cold-dry condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S4_00_4	L	27.25	13	28.01	0.058462	0.76		
	R_D	29.46	11	30.2	0.067273	0.74		
S4_01_5	L	31.89	16	30.9	-0.06188	-0.99		
	R_D	29.9	16	30.82	0.0575	0.92		
S4_03_6	L	33.1	18	30.9	-0.12222	-2.2		
	R_D	32.19	13	31.65	-0.04154	-0.54		
S4_05_7	L	xxx	xxx	xxx	xxx	xxx		
	R_D	xxx	xxx	xxx	xxx	xxx		
S4_07_1	L	30.61	29	32.24	0.056207	1.63		
	R_D	29.91	31	30.55	0.020645	0.64		
S4_11_2	L	30.42	34	29.04	-0.04059	-1.38		
	R_D	31.09	33	29.77	-0.04	-1.32		
S4_13_3	L	28.56	38	27.01	-0.04079	-1.55		
	R_D	29.47	33	29.98	0.015455	0.51		
	mean	30.32083	23.75	30.08917	-0.00596	-0.23167		
	std. dev.	1.615445	10.02837	1.481851	0.060341	1.236386		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S4_00_4	L	48	11.79	35	37.1	79	83	4
	R_D	44	12.61	33	35.73	77	83	6
S4_01_5	L	40	12.53	24	25.25	63	74	11
	R_D	62	9.54	46	32.76	76	74	-2
S4_03_6	L	54	13.05	36	46.1	106	86	-20
	R_D	67	9.04	54	43.38	97	86	-11
S4_05_7	L	xxx	xxx	xxx	xxx	xxx	xxx	xxx
	R_D	xxx	xxx	xxx	xxx	xxx	xxx	xxx
S4_07_1	L	74	9.68	45	34.75	95	96	1
	R_D	70	11.57	39	48.13	113	96	-17
S4_11_2	L	57	12.96	23	30.81	89	103	14
	R_D	64	11.94	31	32.6	93	103	10
S4_13_3	L	64	13.92	26	38.37	104	127	23
	R_D	81	11	48	44.02	113	127	14
	mean	60.41667	11.63583	36.66667	37.41667	92.08333	94.83333	2.75
	std. dev.	12.30269	1.543323	10.00303	6.854772	15.83126	17.86227	13.20554
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
sb_dy_gl	S4_00_4		S4_01_5		S4_03_6		S4_05_7	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	50	49	47	66	57	75	xxx	xxx
final temp	12.6	13.38	13.11	10.47	13.61	12.69	xxx	xxx
delta	0.81	0.77	0.58	0.93	0.56	3.65	xxx	xxx
final time	63	59	62	73	68	85	xxx	xxx
final temp	9.68	10.67	9.66	9.22	9.97	10.21	xxx	xxx
delta	-2.92	-2.71	-3.45	-1.25	-3.64	-2.48		

Table B.4 Data for Subject 4 in the cold-dry condition.

final time	69	65	66		75		
final temp	10.53	11.5	11.29		12.33		
delta	0.85	0.83	1.63		2.36		
final time	83	74	74		86		
final temp	8.07	9.55	8.75		9.32		
delta	-2.46	-1.95	-2.54		-3.01		
final time		82					
final temp		10.38					
delta		0.83					
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
	S4_07_1		S4_11_2		S4_13_3		
	L	R_D	L	R_D	L	R_D	
final time	79	75	58	67	67	89	
final temp	11.8	12.14	14.09	12.85	15.89	12.49	
delta	2.12	0.57	1.13	0.91	1.97	1.49	
final time	81	77	66	73	85	95	
final temp	11.16	11.46	11.79	11.35	10.52	10.59	
delta	-0.64	-0.68	-2.3	-1.5	-5.37	-1.9	
final time	84	80	76	76	89	109	
final temp	12.36	12.19	14.07	13.18	14.14	11.34	
delta	1.2	0.73	2.28	1.83	3.62	0.75	
final time	92	93	91	82	96	126	
final temp	10.27	8.19	9.71	10.79	11.57	9.46	
delta	-2.09	-4	-4.36	-2.39	-2.57	-1.88	
final time	96	95	96	88	104		
final temp	11.12	8.46	11.09	13.29	12.55		
delta	0.85	0.27	1.38	2.5	0.98		
final time			103	94	127		
final temp			8.65	10.17	9.13		
delta			-2.44	-3.12	-3.42		
final time				100			
final temp				11.46			
delta				1.29			
final time				102			
final temp				9.64			
delta				-1.82			

Table B.5 Data for Subject 5 in the cold-dry condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S5_00_5	L	15.03	0	15.03	xxx	0		
	R_D	23.5	0	23.5	xxx	0		
S5_01_6	L	16.93	0	16.93	xxx	0		
	R_D	19.34	0	19.34	xxx	0		
S5_03_7	L	19.72	0	19.72	xxx	0		
	R_D	26.89	0	26.89	xxx	0		
S5_05_1	L	31.33	2	31.13	-0.1	-0.2		
	R_D	30.76	0	30.76	xxx	0		
S5_07_2	L	21.47	0	21.47	xxx	0		
	R_D	25.52	11	28.74	0.292727	3.22		
S5_11_3	L	27.14	1	27.36	0.22	0.22		
	R_D	26.22	1	26.47	0.25	0.25		
S5_13_4	L	25.09	3	27.81	0.906667	2.72		
	R_D	25.96	3	29.76	1.266667	3.8		
	mean	23.92143	1.5	24.63643	0.472677	0.715		
	std. dev.	4.859178	2.954788	5.290765	0.508436	0.431587		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S5_00_5	L	10	7.81	10	15.42	18	55	37
	R_D	25	8.04	25	26.61	43	55	12
S5_01_6	L	33	4.99	33	25.58	30	33	3
	R_D	32	6.03	32	24.66	34	33	-1
S5_03_7	L	24	4.96	24	18.58	26	24	-2
	R_D	23	9.69	23	22.74	40	24	-16
S5_05_1	L	35	9.7	33	28.22	56	74	18
	R_D	32	10.64	32	32.82	63	74	11
S5_07_2	L	30	10.21	30	40.88	59	68	9
	R_D	45	10.06	34	35.36	75	68	-7
S5_11_3	L	30	7.64	29	21.99	40	30	-10
	R_D	29	5.62	28	19.35	34	30	-4
S5_13_4	L	40	4.83	37	20.91	40	40	0
	R_D	39	6.82	36	24.07	47	40	-7
	mean	30.5	7.645714	29	25.51357	43.21429	46.28571	3.071429
	std. dev.	8.573214	2.140125	6.950374	6.945127	15.53249	18.78391	13.56162
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S5_00_5		S5_01_6		S5_03_7		S5_05_1	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	11	31					38	33
final temp	8.75	12.6					11.5	12.1
delta	0.94	4.56					1.8	1.46
final time	13	42					74	35
final temp	8.16	8.91					4.63	11.07
delta	-0.59	-3.69					-6.87	-1.03

Table B.5 Data for Subject 5 in the cold-dry condition.

final time	27	46						44
final temp	15.01	10.05						11.72
delta	6.85	1.14						0.65
final time	28	54						73
final temp	14.28	8.21						7.35
delta	-0.73	-1.84						-4.37
final time	30							
final temp	15.26							
delta	0.98							
final time	55							
final temp	5.73							
delta	-9.53							
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
	S5_07_2		S5_11_3		S5_13_4			
	L	R_D	L	R_D	L	R_D		
final time	35	51						
final temp	11.25	11.44						
delta	1.04	1.38						
final time	68	67						
final temp	4.66	6.52						
delta	-6.59	-4.92						
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								

Table B.6 Data for Subject 6 in the cold-dry condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S6_00_6	L	26.25	2	26.2	-0.025	-0.05		
	R_D	26.82	0	26.82	xxx	0		
S6_01_7	L	28.7	11	28.13	-0.05182	-0.57		
	R_D	27.52	1	27.76	0.24	0.24		
S6_03_1	L	26.34	0	26.34	xxx	0		
	R_D	26.18	0	26.18	xxx	0		
S6_05_2	L	32.97	26	26.48	-0.24962	-6.49		
	R_D	32.89	20	28.19	-0.235	-4.7		
S6_07_3	L	30.61	3	31.62	0.336667	1.01		
	R_D	30.85	3	31.04	0.063333	0.19		
S6_11_4	L	30.2	0	30.2	xxx	0		
	R_D	30.84	0	30.84	xxx	0		
S6_13_5	L	27.78	5	26.11	-0.334	-1.67		
	R_D	28.64	1	28.92	0.28	0.28		
	mean	29.04214	5.142857	28.20214	0.00273	-0.84		
	std. dev.	2.368863	8.207474	2.004215	0.246396	-0.36465		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S6_00_6	L	40	5.29	38	24.57	43	46	3
	R_D	7	13.38	7	13.72	24	46	22
S6_01_7	L	44	6.92	33	24.18	54	107	53
	R_D	57	7.09	56	36.8	65	107	42
S6_03_1	L	44	6.03	44	27.26	46	58	12
	R_D	57	5.08	57	29.84	48	58	10
S6_05_2	L	56	7.89	30	24.05	67	82	15
	R_D	71	6.64	51	28.82	71	82	11
S6_07_3	L	61	5.84	58	30.12	58	61	3
	R_D	60	4.08	57	29.75	57	61	4
S6_11_4	L	34	7.39	34	23.93	44	49	5
	R_D	35	8.32	35	26.3	48	49	1
S6_13_5	L	31	7.59	26	20.14	40	61	21
	R_D	32	7.82	31	22.82	43	61	18
	mean	44.92857	7.097143	39.78571	25.87857	50.57143	66.28571	15.71429
	std. dev.	16.69392	2.181159	14.86958	5.410397	12.44504	20.52926	15.22866
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S6_00_6		S6_01_7		S6_03_1		S6_05_2	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	43	8	57	65	52		63	78
final temp	5.92	17.37	13.48	10.26	7.63		8.52	8.88
delta	0.63	3.99	6.56	3.34	1.6		0.63	2.24
final time	46	45	84	85	58		82	81
final temp	4.9	7.77	5.14	6.08	6.69		4.97	8.5
delta	-1.02	-9.6	-8.34	-4.18	-0.94		-3.55	-0.38

Table B.6 Data for Subject 6 in the cold-dry condition.

final time			92	107			
final temp			9.32	12.98			
delta			4.18	6.9			
final time			107				
final temp			4.97				
delta			-4.35				
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
	S6_07_3		S6_11_4		S6_13_5		
	L	R_D	L	R_D	L	R_D	
final time			38	38	38	37	
final temp			9.41	8.88	10.32	10.37	
delta			2.02	0.56	2.73	2.55	
final time			49	48	61	60	
final temp			4.66	5.57	5.28	5.06	
delta			-4.75	-3.31	-5.04	-5.31	
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							

Table B.7 Data for Subject 7 in the cold-dry condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S7_00_7	L_D	26.89	0	26.89	xxx	0		
	R	27.14	0	27.14	xxx	0		
S7_01_1	L_D	32.56	18	29.89	-0.14833	-2.67		
	R	31.43	22	27.79	-0.16545	-3.64		
S7_03_2	L_D	32.1	1	32.13	0.03	0.03		
	R	31.4	0	31.4	xxx	0		
S7_05_3	L_D	32.84	25	30.56	-0.0912	-2.28		
	R	32.93	25	30.7	-0.0892	-2.23		
S7_07_4	L_D	30.7	18	28.68	-0.11222	-2.02		
	R	30.97	27	27.31	-0.13556	-3.66		
S7_11_5	L_D	31.33	9	32.54	0.134444	1.21		
	R	30.78	9	30.39	-0.04333	-0.39		
S7_13_6	L_D	32.49	26	30.98	-0.05808	-1.51		
	R	32.25	14	31.46	-0.05643	-0.79		
	mean	31.12929	13.85714	29.84714	-0.06685	-1.28214		
	std. dev.	1.895085	10.58923	1.929438	0.086529	0.034353		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S7_00_7	L_D	29	9.62	29	26.19	45	99	54
	R	31	11.15	31	31.76	53	99	46
S7_01_1	L_D	51	10.68	33	30.82	75	78	3
	R	66	9.51	44	27.31	69	78	9
S7_03_2	L_D	32	12.56	31	30.48	60	100	40
	R	31	9.81	31	25.95	50	100	50
S7_05_3	L_D	61	9.41	36	26.78	74	87	13
	R	59	8.55	34	23.79	69	87	18
S7_07_4	L_D	59	8.52	41	32.05	75	84	9
	R	63	8.79	36	28.35	76	84	8
S7_11_5	L_D	59	9.67	50	32.42	71	69	-2
	R	38	8.52	29	23	52	69	17
S7_13_6	L_D	56	11.74	30	28.09	77	78	1
	R	77	8.43	63	38.47	87	78	-9
	mean	50.85714	9.782857	37	28.96143	66.64286	85	18.35714
	std. dev.	15.62964	1.300766	9.69536	4.049285	12.47525	10.95445	20.601
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S7_00_7		S7_01_1		S7_03_2		S7_05_3	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time	35	35	56	70	41	41	66	67
final temp	15.63	12.55	12.69	10.08	14.56	14.64	10.4	11.54
delta	6.01	1.4	2.01	0.57	2	4.83	0.99	2.99
final time	55	52	78	77	56	61	87	86
final temp	8.54	8.51	8.27	9.15	8.56	6.8	8.25	7.7
delta	-7.09	-4.04	-4.42	-0.93	-6	-7.84	-2.15	-3.84

Table B.7 Data for Subject 7 in the cold-dry condition.

final time	63	59			67	74		
final temp	11.18	12.23			14.31	14.57		
delta	2.64	3.72			5.75	7.77		
final time	81	79			93	99		
final temp	7.82	7.2			9.31	6.77		
delta	-3.36	-5.03			0.75	-7.8		
final time	90	89			100			
final temp	13.96	13.49			11.09			
delta	6.14	6.29			1.78			
final time	99	98						
final temp	11.52	10.9						
delta	-2.44	-2.59						
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
	S7_07_4		S7_11_5		S7_13_6			
	L_D	R	L_D	R	L_D	R		
final time	70	71	66	43	61			
final temp	11.89	11.81	10.9	11.89	13.01			
delta	3.37	3.02	1.23	3.37	1.27			
final time	84	83	69	59	74			
final temp	9.1	9.52	10.62	6.77	8.56			
delta	-2.79	-2.29	-0.28	-5.12	-4.45			
final time				66	78			
final temp				10.58	11.86			
delta				3.81	3.3			
final time				68				
final temp				10.48				
delta				-0.1				
final time								
final temp								
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Table B.8 Data for Subject 8 in the cold-dry condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S8_00_1	L_D	30.52	1	30.3	-0.22	-0.22		
	R	30.48	2	30.33	-0.075	-0.15		
S8_01_2	L_D	29.81	0	29.81	xxx	0		
	R	28.68	0	28.68	xxx	0		
S8_08_3	L_D	18.19	1	18.82	0.63	0.63		
	R	xxx	xxx	xxx	xxx	xxx		
S8_05_4	L_D	xxx	xxx	xxx	xxx	xxx		
	R	xxx	xxx	xxx	xxx	xxx		
S8_07_5	L_D	30.85	6	29.48	-0.22833	-1.37		
	R	xxx	xxx	xxx	xxx	xxx		
S8_11_6	L_D	32.31	34	28.41	-0.11471	-3.9		
	R	31.22	8	30.85	-0.04625	-0.37		
S8_18_7	L_D	29.22	9	26.07	-0.35	-3.15		
	R	31.38	0	31.38	xxx	0		
	mean	29.266	6.1	28.413	-0.05776	-0.853		
	std. dev.	4.033576	10.38642	3.691648	0.320808	1.503256		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	final	final					
		time	temp.	duration	time const	time @ 5	endurance	endur. ext
S8_00_1	L_D	79	5.2	78	39.45	74	79	5
	R	49	5.08	47	27.18	52	79	27
S8_01_2	L_D	31	8.93	31	25.73	48	31	-17
	R	31	4.98	31	18.73	34	31	-3
S8_08_3	L_D	29	4.74	28	21.13	30	29	-1
	R	xxx	xxx	xxx	xxx	xxx	xxx	xxx
S8_05_4	L_D	xxx	xxx	xxx	xxx	xxx	xxx	xxx
	R	xxx	xxx	xxx	xxx	xxx	xxx	xxx
S8_07_5	L_D	38	4.88	32	19.7	43	38	-5
	R	xxx	xxx	xxx	xxx	xxx	xxx	xxx
S8_11_6	L_D	62	9.14	28	25.02	78	62	-16
	R	61	5.08	53	39.03	85	62	-23
S8_18_7	L_D	41	8.21	32	29.51	59	41	-18
	R	40	5.16	40	24.35	48	41	-7
	mean	46.1	6.14	40	26.983	55.1	49.3	-5.8
	std. dev.	16.47523	1.827366	15.77621	7.262909	18.62764	19.53373	14.52813
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S8_00_1		S8_01_2		S8_08_3		S8_05_4	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time		59						
final temp		12.08						
delta		7						
final time		78						
final temp		5.4						
delta		-6.68						

Table B.8 Data for Subject 8 in the cold-dry condition.

final time								
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final time								
final temp								
delta								
	S8_07_5		S8_11_6		S8_18_7			
	L_D	R	L_D	R	L_D	R		
final time								
final temp								
delta								
final time								
final temp								
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Table B.9 Data for Subject 1 in the cold-wet condition

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S1_15_1	L	31.33	9	30.7	0.07	-0.63		
	R_D	32.19	8	31.47	0.09	-0.72		
S1_17_2	L	31.01	32	28.67	0.073125	-2.34		
	R_D	32.47	78	28.62	0.049359	-3.85		
S1_19_3	L	33.4	83	27.63	0.069518	-5.77		
	R_D	33.03	63	26.05	0.110794	-6.98		
S1_21_4	L	33.07	94	30.83	0.02383	-2.24		
	R_D	32.49	58	24.82	0.132241	-7.67		
S1_23_5	L	32.86	19	28.97	0.204737	-3.89		
	R_D	32.95	19	29.76	0.167895	-3.19		
S1_25_6	L	31.93	25	29.72	0.0884	-2.21		
	R_D	30.18	15	28.15	0.135333	-2.03		
S1_27_7	L	33.84	58	29.56	0.073793	-4.28		
	R_D	33.9	87	27.44	0.074253	-6.46		
	mean	32.475	46.28571	28.74214	0.097377	-3.73286		
	std. dev.	1.07016	31.40659	1.84559	0.048349	2.259293		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	final	final					
		time	temp.	duration	time const	time @ 5	endurance	endur. ext
S1_15_1	L	55	10.46	46	37.18	76	88	12
	R_D	55	9.96	47	35.86	75	88	13
S1_17_2	L	99	8.89	67	50.75	118	167	49
	R_D	166	9.21	88	67.98	192	167	-25
S1_19_3	L	120	11.93	37	42.65	155	178	23
	R_D	121	9.16	58	48.95	142	178	36
S1_21_4	L	154	10.66	60	50.76	185	240	55
	R_D	92	9.76	34	30.89	106	240	134
S1_23_5	L	63	10.34	44	39.18	89	240	151
	R_D	68	10.5	49	43.33	98	240	142
S1_25_6	L	94	10.56	69	62.14	143	240	97
	R_D	51	9.79	36	30.5	67	240	173
S1_27_7	L	112	10.2	54	47.03	140	240	100
	R_D	135	11.25	48	48.93	169	240	71
	mean	98.92857	10.19071	52.64286	45.43786	125.3571	199	73.64286
	std.dev.	37.63277	0.823206	14.84073	10.80172	41.56664	56.17281	60.48726
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S1_15_1		S1_17_2		S1_19_3		S1_21_4	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	64	66	125		124	129	159	97
final temp	11.24	12.03	10.79		13.38	10.61	12.35	13.23
delta	0.78	2.07	1.9		1.45	1.45	1.69	3.47
final time	88	87	144		178	177	226	112
final temp	7.47	7.54	7.98		9.58	7.53	9.46	8.57
delta	3.77	4.49	-2.81		-3.8	-3.08	-2.89	-4.66

Table B.9 Data for Subject 1 in the cold-wet condition

final time			160				232	118
final temp			11.84				11.67	10.32
delta			3.86				2.21	1.75
final time			167				240	134
final temp			10.77				10.32	7.7
delta			-1.07				-1.35	-2.62
final time								148
final temp								11.37
delta								3.67
final time								188
final temp								6.08
delta								-5.29
final time								202
final temp								13.3
delta								7.22
final time								239
final temp								7.53
delta								-5.77
final time								
final temp								
delta								
final time								
final temp								
delta								
	S1_23_5		S1_25_6		S1_27_7			
	L	R_D	L	R_D	L	R_D		
final time	71	72	98	57	117	139		
final temp	13.09	14.4	11.75	10.37	12.54	12.18		
delta	2.75	3.9	1.19	0.58	2.34	0.93		
final time	84	105	129	86	135	167		
final temp	9.09	9	8.57	8	8.75	9.75		
delta	-4	-5.4	-3.18	-2.37	-3.79	-2.43		
final time	91	112	141	98	142	176		
final temp	11.21	12.04	13.32	12.61	10.42	11.22		
delta	2.12	3.04	4.75	4.61	1.67	1.47		
final time	106	134	160	129	161	228		
final temp	8.77	7.49	9.41	6.81	8.3	7.69		
delta	-2.44	-4.55	-3.91	-5.8	-2.12	-3.53		
final time	112	145	166	142	178	236		
final temp	11.2	10.99	10.29	12.41	13.05	13.17		
delta	2.43	3.5	0.88	5.6	4.75	5.48		
final time	134	201	180	180	220	239		
final temp	7.52	5.53	8.75	5.79	7.25	12.98		
delta	-3.68	-5.46	-1.54	-6.62	-5.8	-0.19		
final time	144	217	188	188	236			
final temp	13.5	17.27	10.16	12.69	13.61			
delta	5.98	11.74	1.41	6.9	6.36			
final time	165	239	217	237	240			
final temp	7.85	12.42	7.82	6.55	12.86			
delta	-5.65	-4.85	-2.34	-6.14	-0.75			

Table B.9 Data for Subject 1 in the cold-wet condition

final time	178		235	239				
final temp	8.88		17.12	7.64				
delta	1.03		9.3	1.09				
final time	193		240					
final temp	7.52		15.93					
delta	-1.36		-1.19					
final time	209							
final temp	9.97							
delta	2.45							
final time	229							
final temp	8.51							
delta	-1.46							
final time	240							
final temp	11.13							
delta	2.62							
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								

Table B.10 Data for Subject 2 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gr	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S2_15_2	L	33.86	92	32.66	-0.01304	-1.2		
	R_D	33.45	100	30.35	-0.031	-3.1		
S2_17_3	L	34.22	121	32.86	-0.01124	-1.36		
	R_D	33.09	121	31.91	-0.00975	-1.18		
S2_19_4	L	32.7	100	32.55	-0.0015	-0.15		
	R_D	32.28	76	30.11	-0.02855	-2.17		
S2_21_5	L	32.41	93	31.27	-0.01226	-1.14		
	R_D	32.27	93	30.55	-0.01849	-1.72		
S2_23_6	L	31.19	84	29.06	-0.02536	-2.13		
	R_D	33.29	86	29.6	-0.04291	-3.69		
S2_25_7	L	32.93	87	31.26	-0.0192	-1.67		
	R_D	32.91	75	30.14	-0.03693	-2.77		
S2_27_1	L	33.53	64	32.65	-0.01375	-0.88		
	R_D	32.95	65	32.76	-0.00292	-0.19		
	mean	32.93429	89.78571	31.26643	-0.01906	-1.66786		
	std.dev.	0.760776	17.37894	1.309519	0.012366	1.028899		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gr	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S2_15_2	L	154	11.96	62	55.06	200	158	-42
	R_D	153	11.64	53	51.92	192	158	-34
S2_17_3	L	173	19.57	52	139.74	385	173	-212
	R_D	172	11.95	51	49.51	214	173	-41
S2_19_4	L	129	20.51	29	74.32	237	129	-108
	R_D	128	10.93	52	45.19	156	129	-27
S2_21_5	L	134	14.04	41	51.36	188	134	-54
	R_D	133	13.78	40	50.99	187	134	-53
S2_23_6	L	126	9.93	42	36.73	148	126	-22
	R_D	125	10.48	39	39.12	150	126	-24
S2_25_7	L	150	11.73	63	57.73	191	150	-41
	R_D	145	8.74	70	48.59	160	150	-10
S2_27_1	L	111	16.23	47	80.92	216	111	-105
	R_D	110	15.27	45	75.91	205	111	-94
	mean	138.7857	13.34	49	61.22071	202.0714	140.1429	-61.9286
	std.dev.	19.7958	3.498096	10.94743	26.19622	58.97126	20.40685	53.11304
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
sb_dy_gr	S2_15_2		S2_17_3		S2_19_4		S2_21_5	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	158	157						
final temp	12.73	13.67						
delta	0.77	2.03						
final time								
final temp								
delta								

Table B.10 Data for Subject 2 in the cold-wet condition.

final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
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final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
	S2_23_6		S2_25_7		S2_27_1		
	L	R_D	L	R_D	L	R_D	
final time				149			
final temp				9.58			
delta				0.84			
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
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final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							

Table B.11 Data for Subject 3 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S3_15_3	L_D	33.65	86	29.16	-0.05221	-4.49		
	R	33.44	72	29.35	-0.05681	-4.09		
S3_17_4	L_D	33.15	82	28.73	-0.0539	-4.42		
	R	33.41	78	31.7	-0.02192	-1.71		
S3_19_5	L_D	31.12	50	30.4	-0.0144	-0.72		
	R	32.06	50	30.21	-0.037	-1.85		
S3_21_6	L_D	29.07	35	29.02	-0.00143	-0.05		
	R	28.97	35	28.15	-0.02343	-0.82		
S3_23_7	L_D	32.9	54	30.08	-0.05222	-2.82		
	R	33.67	54	31.95	-0.03185	-1.72		
S3_25_1	L_D	33.11	58	31.9	-0.02086	-1.21		
	R	32.71	43	29.43	-0.07628	-3.28		
S3_27_2	L_D	33.46	74	29.42	-0.05459	-4.04		
	R	33.35	74	29.72	-0.04905	-3.63		
	mean	32.43357	60.35714	29.94429	-0.039	-2.48929		
	std. dev.	1.600671	17.17156	1.187536	0.020676	1.515172		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S3_15_3	L_D	142	10.97	56	51.26	177	203	26
	R	122	10.05	50	43.57	148	203	55
S3_17_4	L_D	110	14.61	28	38.57	150	240	90
	R	123	13.15	45	46.46	165	240	75
S3_19_5	L_D	91	11.1	41	42.58	129	154	25
	R	83	11.76	33	33.3	111	154	43
S3_21_6	L_D	64	11.81	29	30.61	90	223	133
	R	64	10.32	29	27.34	82	223	141
S3_23_7	L_D	102	11.54	48	45.82	140	240	100
	R	107	12.02	53	49.93	151	240	89
S3_25_1	L_D	111	11.22	53	52.27	156	240	84
	R	93	10.86	50	48.82	132	240	108
S3_27_2	L_D	115	11.25	41	38.24	143	240	97
	R	116	11.98	42	39.18	144	240	96
	mean	103.0714	11.61714	42.71429	41.99643	137	220	83
	std. dev.	22.20694	1.155418	9.690825	7.805794	26.78116	31.0186	35.39883
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S3_15_3		S3_17_4		S3_19_5		S3_21_6	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time	152	130	113	128	100	89	81	81
final temp	14.92	16.41	16.83	15.13	19	16.25	28.61	28.51
delta	4.87	6.36	2.22	1.98	7.9	4.49	16.8	18.19
final time	180	152	138	167	128	108	116	116
final temp	11.93	10.41	12.73	9.77	9.69	10.64	9.48	8.16
delta	-2.99	-6	-4.1	-5.36	-9.31	-5.61	-19.13	-20.35

Table B.11 Data for Subject 3 in the cold-wet condition.

final time	189	161	147	190	137	117	124	125
final temp	18.69	15.41	13.73	16.32	15.14	18.85	16	16.43
delta	6.76	5	1	6.55	5.45	8.21	6.52	8.27
final time	203	180	166	224	154	153	144	147
final temp	15.02	11.53	10.76	9.69	10.98	8.41	8.19	7.85
delta	-3.67	-3.88	-2.97	-6.63	-4.16	-10.44	-7.81	-8.58
final time		191	174	233			157	157
final temp		23.7	13.74	12.85			26.11	22.77
delta		12.17	2.98	3.16			17.92	14.92
final time		203	191	239			194	203
final temp		20.78	10.34	12.72			8.73	7.62
delta		-2.92	-3.4	-0.13			-17.38	-15.15
final time			204				206	213
final temp			12.88				14	13.53
delta			2.54				5.27	5.91
final time			223				223	222
final temp			9.36				8.75	10.7
delta			-3.52				-5.25	-2.83
final time			234					
final temp			15.04					
delta			5.68					
final time			240					
final temp			13.56					
delta			-1.48					
	S3_23_7		S3_25_1		S3_27_2			
	L_D	R	L_D	R	L_D	R		
final time	112	116	118	101	125	128		
final temp	20.89	13.52	16.88	20.19	27.12	19.89		
delta	9.35	1.5	5.66	9.33	15.87	7.91		
final time	142	133	167	132	166	166		
final temp	9.36	10.46	9.79	9.65	9.71	9.31		
delta	-11.53	-3.06	-7.09	-10.54	-17.41	-10.58		
final time	153	157	185	142	179	181		
final temp	16.77	14.53	15.82	17.68	14.55	22.12		
delta	7.41	4.07	6.03	8.03	4.84	12.81		
final time	190	171	227	176	203	217		
final temp	8.19	10.65	8.97	7.78	8.42	9.13		
delta	-8.58	-3.88	-6.85	-9.9	-6.13	-12.99		
final time	202	175	240	185	214	226		
final temp	15.67	11.29	13.91	21.86	15.37	11.86		
delta	7.48	0.64	4.94	14.08	6.95	2.73		
final time	240	195		229	240	239		
final temp	8.96	8.27		9.23	8.57	9.3		
delta	-6.71	-3.02		-12.63	-6.8	-2.56		
final time		209		239				
final temp		18.53		10.63				
delta		10.26		1.4				
final time		239						
final temp		12.05						
delta		-6.48						

Table B.12 Data for Subject 4 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S4_15_4	L	32.53	45	32.76	0.005111	0.23		
	R_D	33.02	43	33.03	0.000233	0.01		
S4_17_5	L	31.73	96	30.18	-0.01615	-1.55		
	R_D	30.64	96	28.88	-0.01833	-1.76		
S4_19_6	L	29.49	33	30	0.015455	0.51		
	R_D	31.19	33	31.55	0.010909	0.36		
S4_21_7	L	31.99	84	31.01	-0.01167	-0.98		
	R_D	32.58	84	30.52	-0.02452	-2.06		
S4_23_1	L	32.82	54	29.84	-0.05519	-2.98		
	R_D	32.16	45	30.15	-0.04467	-2.01		
S4_25_2	L	32.17	51	32.18	0.000196	0.01		
	R_D	31.88	52	31.93	0.000962	0.05		
S4_27_3	L	31.64	94	29.83	-0.01926	-1.81		
	R_D	31.18	110	29.25	-0.01755	-1.93		
	mean	31.78714	65.71429	30.79357	-0.01246	-0.99357		
	std. dev.	0.938308	26.77665	1.303207	0.020124	1.151932		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S4_15_4	L	91	17.17	46	70.55	181	207	26
	R_D	91	14.96	48	55.61	152	207	55
S4_17_5	L	142	13.58	46	66.91	216	168	-48
	R_D	141	12.98	45	58.41	199	168	-31
S4_19_6	L	110	10.04	77	59.7	136	136	0
	R_D	91	12.47	58	61.61	151	136	-15
S4_21_7	L	152	11.91	68	64.73	200	180	-20
	R_D	179	12.59	95	91.5	239	180	-59
S4_23_1	L	106	11.79	52	46.69	140	178	38
	R_D	106	10.72	61	47.54	132	178	46
S4_25_2	L	158	9.97	107	89.85	220	218	-2
	R_D	153	11.23	101	97.64	240	218	-22
S4_27_3	L	147	13.44	53	65.2	212	166	-46
	R_D	147	12.58	37	42.56	184	166	-18
	mean	129.5714	12.53071	63.85714	65.60714	185.8571	179	-6.85714
	std. dev.	29.29089	1.926118	22.64732	16.93742	37.99161	26.15339	36.05734
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S4_15_4		S4_17_5		S4_19_6		S4_21_7	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	94	94	146	146	117	98	156	169
final temp	18.25	16.77	14.62	14.5	12.34	13.53	12.8	13.23
delta	1.08	1.81	1.04	1.52	2.3	1.06	0.89	0.64
final time	102	144	168	167	136	113	165	179
final temp	16.05	11.73	11.04	10.67	9.21	11.79	11.33	12.59
delta	-2.2	-5.04	-3.58	-3.83	-3.13	-1.74	-1.47	-0.64

Table B.12 Data for Subject 4 in the cold-wet condition.

final time	105	162				116	169	
final temp	16.57	16.05				12.47	14.17	
delta	0.52	4.32				0.68	2.84	
final time	120	166				122	180	
final temp	13.47	15.13				11.35	12.3	
delta	-3.1	-0.92				-1.12	-1.87	
final time	129	183				127		
final temp	15.03	31.25				12.25		
delta	1.56	16.12				0.9		
final time	145	206				135		
final temp	13.05	24.01				11.18		
delta	-1.98	-7.24				-1.07		
final time	162							
final temp	17.55							
delta	4.5							
final time	166							
final temp	16.87							
delta	-0.68							
final time	184							
final temp	30.96							
delta	14.09							
final time	207							
final temp	24.92							
delta	-6.04							
	S4_23_1		S4_25_2		S4_27_3			
	L	R_D	L	R_D	L	R_D		
final time	111	114	166	164	154	153		
final temp	13.18	12.31	12.25	12	15.98	15.59		
delta	1.39	1.59	2.28	0.77	2.54	3.01		
final time	117	129	176	175	161	165		
final temp	12.09	9.9	10.56	10.69	15	14.74		
delta	-1.09	-2.41	-1.69	-1.31	-0.98	-0.85		
final time	120	133	180	179	166			
final temp	12.89	13.26	11.23	11.7	15.63			
delta	0.8	3.36	0.67	1.01	0.63			
final time	131	157	188	187				
final temp	10.71	10.22	10.01	10.78				
delta	-2.18	-3.04	-1.22	-0.92				
final time	135	166	204	213				
final temp	11.26	11.91	11.67	11.79				
delta	0.55	1.69	1.66	1.01				
final time	161	175	218	217				
final temp	9.91	10.95	9.54	11.26				
delta	-1.35	-0.96	-2.13	-0.53				
final time	167	177						
final temp	12.36	11						
delta	2.45	0.05						
final time	178							
final temp	11.44							
delta	-0.92							

Table B.13 Data for Subject 5 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S5_15_5	L	30.03	9	28.87	-0.12889	-1.16		
	R_D	31.02	9	31.6	0.064444	0.58		
S5_17_6	L	15.3	1	15.6	0.3	0.3		
	R_D	21.2	5	22.07	0.174	0.87		
S5_19_7	L	25.72	0	25.72	xxx	0		
	R_D	28.17	0	28.17	xxx	0		
S5_21_1	L	19.95	0	19.95	xxx	0		
	R_D	27.19	10	26.43	-0.076	-0.76		
S5_23_2	L	20.09	0	20.09	xxx	0		
	R_D	25.43	9	26.53	0.122222	1.1		
S5_25_3	L	22.51	0	22.51	xxx	0		
	R_D	23.58	0	23.58	xxx	0		
S5_27_4	L	18.37	1	18.58	0.21	0.21		
	R_D	21.58	1	21.84	0.26	0.26		
	mean	23.58143	3.214286	23.68143	0.115722	0.1		
	std. dev.	4.565145	4.172779	4.429995	0.154144	-0.13515		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S5_15_5	L	133	4.97	124	53.08	90	133	43
	R_D	85	7.83	76	40.27	82	133	51
S5_17_6	L	72	5.61	71	62.74	69	86	17
	R_D	73	6.66	68	52.07	79	86	7
S5_19_7	L	88	5.02	88	43.75	69	88	19
	R_D	87	6.03	87	43.98	72	88	16
S5_21_1	L	64	5.77	64	47.47	63	230	167
	R_D	66	7.96	56	42.05	80	230	150
S5_23_2	L	97	5.04	97	57.69	72	97	25
	R_D	96	7.24	87	53.72	97	97	0
S5_25_3	L	58	4.98	58	36.49	56	58	2
	R_D	57	5.74	57	37.4	59	58	-1
S5_27_4	L	58	5.03	57	38.12	50	58	8
	R_D	57	5.94	56	38.81	58	58	0
	mean	77.92857	5.987143	74.71429	46.26	71.14286	107.1429	36
	std.dev.	21.52446	1.051105	19.97471	8.322522	13.46138	57.52439	54.30965
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S5_15_5		S5_17_6		S5_19_7		S5_21_1	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time		101	79	80			82	68
final temp		10.13	6.18	7.5			14.12	8.58
delta		2.3	0.57	0.84			8.35	0.62
final time		132	86	85			149	195
final temp		6.12	5.02	6.6			6	7.11
delta		-4.01	-1.16	-0.9			-8.12	-1.47

Table B.13 Data for Subject 5 in the cold-wet condition.

final time							166	213
final temp							15.15	15.72
delta							9.15	8.61
final time							230	229
final temp							4.97	13.08
delta							-10.18	-2.64
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
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final time								
final temp								
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final time								
final temp								
delta								
final time								
final temp								
delta								
	S5_23_2		S5_25_3		S5_27_4			
	L	R_D	L	R_D	L	R_D		
final time								
final temp								
delta								
final time								
final temp								
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Table B.14 Data for Subject 6 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S6_15_6	L	25.19	2	27.13	0.97	1.94		
	R_D	24.07	2	26.27	1.1	2.2		
S6_17_7	L	30.51	37	31.33	0.022162	0.82		
	R_D	31.07	16	31.74	0.041875	0.67		
S6_19_1	L	30.83	13	29.59	-0.09538	-1.24		
	R_D	32.32	12	30.63	-0.14083	-1.69		
S6_21_2	L	31.83	36	23.88	-0.22083	-7.95		
	R_D	32.28	28	28.07	-0.15036	-4.21		
S6_23_3	L	31.04	10	31.34	0.03	0.3		
	R_D	32.08	25	27.42	-0.1864	-4.66		
S6_25_4	L	31.38	35	30.41	-0.02771	-0.97		
	R_D	31.93	51	28.75	-0.06235	-3.18		
S6_27_5	L	24.76	0	24.76	xxx	0		
	R_D	28.27	3	28.5	0.076667	0.23		
	mean	29.82571	19.28571	28.55857	0.104371	-1.26714		
	std. dev.	2.979251	16.12179	2.472818	0.424069	-0.50643		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
		final	final					
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S6_15_6	L	50	5.73	48	28.07	51	58	7
	R_D	57	5.13	55	28.21	49	58	9
S6_17_7	L	157	8.61	120	75.39	175	240	65
	R_D	136	9.61	120	93.93	194	240	46
S6_19_1	L	151	5.04	138	66.74	119	151	32
	R_D	56	9.74	44	35.12	77	151	74
S6_21_2	L	95	8.41	59	48.66	110	204	94
	R_D	96	8.46	68	48.62	111	204	93
S6_23_3	L	84	9.82	74	56.85	115	135	20
	R_D	124	7.31	99	71.53	148	135	-13
S6_25_4	L	96	10.09	61	48.2	124	240	116
	R_D	96	11.92	45	46.05	131	240	109
S6_27_5	L	52	8.24	52	41.01	65	100	35
	R_D	63	9.51	60	47.17	84	100	16
	mean	93.78571	8.401429	74.5	52.53929	110.9286	161.1429	50.21429
	std.dev.	36.65678	2.002452	31.42451	18.73588	43.36689	67.29597	41.64166
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S6_15_6		S6_17_7		S6_19_1		S6_21_2	
HAND	L	R_D	L	R_D	L	R_D	L	R_D
final time	58		177	145		64	101	102
final temp	6.88		12.56	10.4		10.52	9.21	9
delta	1.15		3.95	0.79		0.78	0.8	0.54
final time			221	159		84	122	124
final temp			7.5	8.98		7.93	6.98	7.49
delta			-5.06	-1.42		-2.59	-2.23	-1.51

Table B.14 Data for Subject 6 in the cold-wet condition.

final time			232	181		111	131	133
final temp			8.09	11.19		10.26	16.8	15.59
delta			0.59	2.21		2.33	9.82	8.1
final time			240	239		137	189	184
final temp			7.46	7.91		5.89	5.39	5.78
delta			-0.63	-3.28		-4.37	-11.41	-9.81
final time						150	203	195
final temp						15.23	14.8	17.68
delta						9.34	9.41	11.9
final time						151	204	204
final temp						13.32	14.76	16.07
delta						-1.91	-0.04	-1.61
final time								
final temp								
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delta								
final time								
final temp								
delta								
	S6_23_3		S6_25_4		S6_27_5			
	L	R_D	L	R_D	L	R_D		
final time	91	132	104	103	60	69		
final temp	10.9	8.02	12.62	13.46	11.29	10.74		
delta	1.08	0.71	2.53	1.54	3.05	1.23		
final time	124	134	117	117	75	99		
final temp	7.08	7.88	9.75	9.95	8.95	7.18		
delta	-3.82	-0.14	-2.87	-3.51	-2.34	-3.56		
final time	130		121	124	78			
final temp	9.77		12.05	12.68	10.17			
delta	2.69		2.3	2.73	1.22			
final time	135		138	138	100			
final temp	8.92		9.63	10.31	6.32			
delta	-0.85		-2.42	-2.37	-3.85			
final time			146	147				
final temp			12.63	10.88				
delta			3	0.57				
final time			177	178				
final temp			7.39	7.35				
delta			-5.24	-3.53				
final time			182	204				
final temp			7.94	9.54				
delta			0.55	2.19				
final time			192	239				
final temp			7.05	5.39				
delta			-0.89	-4.15				

Table B.14 Data for Subject 6 in the cold-wet condition.

final time			214					
final temp			7.71					
delta			0.66					
final time			226					
final temp			6.21					
delta			-0.84					
final time			234					
final temp			7.58					
delta			1.37					
final time			240					
final temp			6.98					
delta			-0.6					
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								

Table B.15 Data for Subject 7 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S7_15_7	L_D	32.18	55	29.38	-0.05091	-2.8		
	R	32.75	44	31.91	-0.01909	-0.84		
S7_17_1	L_D	29.6	39	30.12	0.013333	0.52		
	R	30.82	40	30.2	-0.0155	-0.62		
S7_19_2	L_D	27.47	44	28.12	0.014773	0.65		
	R	30.36	43	30.44	0.00186	0.08		
S7_21_3	L_D	32.02	36	30.61	-0.03917	-1.41		
	R	32.01	36	28.82	-0.08861	-3.19		
S7_23_4	L_D	33.68	41	31.9	-0.04341	-1.78		
	R	33.03	42	28.46	-0.10881	-4.57		
S7_25_5	L_D	29.42	5	30.06	0.128	0.64		
	R	31.94	35	30.39	-0.04429	-1.55		
S7_27_6	L_D	29.19	0	29.19	xxx	0		
	R	26.01	1	26.18	0.17	0.17		
	mean	30.74857	32.92857	29.69857	-0.00629	-1.05		
	std. dev.	2.207553	17.4861	1.511321	0.078229	-0.69623		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S7_15_7	L_D	99	12.46	44	47.51	142	177	35
	R	98	10.92	54	48.11	135	177	42
S7_17_1	L_D	101	10.46	62	51.39	130	167	37
	R	116	11.78	76	62.85	146	167	21
S7_19_2	L_D	113	10.24	69	61.49	146	152	6
	R	110	10.19	67	53.45	137	152	15
S7_21_3	L_D	85	10.84	49	53.84	134	171	37
	R	83	9.38	47	38.25	103	171	68
S7_23_4	L_D	105	10.48	64	49.22	132	138	6
	R	81	10.68	39	37.41	106	138	32
S7_25_5	L_D	83	6.75	78	46.15	85	131	46
	R	83	9.05	48	35.9	99	131	32
S7_27_6	L_D	38	9.82	38	31.59	57	135	78
	R	46	8.44	45	35.15	58	135	77
	mean	88.64286	10.10643	55.71429	46.59357	115	153	38
	std. dev.	23.14372	1.412225	13.44178	9.77951	30.88938	18.10227	23.2875
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S7_15_7		S7_17_1		S7_19_2		S7_21_3	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time	104	104	117	122	123	123	91	91
final temp	13.6	13.98	15.42	13.05	11.25	11.64	17.17	17.52
delta	1.14	3.06	4.96	1.27	1.01	1.45	6.33	8.14
final time	121	142	147	148	152	151	117	124
final temp	10.95	9.1	9.73	9.23	9.87	9.58	8.93	8.23
delta	-2.65	-4.88	-5.69	-3.82	-1.38	-2.06	-8.24	-9.29

Table B.15 Data for Subject 7 in the cold-wet condition.

final time	129	176	161	159			131	134
final temp	11.76	14.81	11.63	12.73			11.18	9.71
delta	0.81	5.71	1.9	3.5			2.25	1.48
final time	142		167	166			147	147
final temp	10.62		10.95	11.96			8.88	7.93
delta	-1.14		-0.68	-0.77			-2.3	-1.78
final time	147						153	155
final temp	11.64						10.23	10.5
delta	1.02						1.35	2.57
final time	161						169	170
final temp	10.58						8.5	7.97
delta	-1.06						-1.73	-2.53
final time	177						171	
final temp	14.76						9.14	
delta	4.18						0.64	
final time								
final temp								
delta								
final time								
final temp								
delta								
final time								
final temp								
delta								
	S7_23_4		S7_25_5		S7_27_6			
	L D	R	L D	R	L D	R		
final time	116	86	94	91	51	56		
final temp	11.75	11.64	10.95	9.82	13.48	12.31		
delta	1.27	0.96	4.2	0.77	3.66	3.87		
final time	130	105	107	101	74	76		
final temp	9.97	9.58	8.62	8.95	8.27	7.24		
delta	-1.78	-2.06	-2.33	-0.87	-5.21	-5.07		
final time	135	114	117	110	83	84		
final temp	10.92	10.96	11.72	11.67	10.82	10.69		
delta	0.95	1.38	3.1	2.72	2.55	3.45		
final time	138	129	124	128	103	98		
final temp	10.71	8.93	9.81	9.56	9.42	8.86		
delta	-0.21	-2.03	-1.91	-2.11	-1.4	-1.83		
final time		135	131	130	110	109		
final temp		10.54	9.95	9.69	12.23	10.85		
delta		1.61	0.14	0.13	2.81	1.99		
final time		137			135	134		
final temp		10.47			8.61	7.57		
delta		-0.07			-3.62	-3.28		
final time								
final temp								
delta								
final time								
final temp								
delta								

Table B.16 Data for Subject 8 in the cold-wet condition.

PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1		
sb_dy_gl	hand	initial	final	final				
		temp.	time	temp.	slope	del. temp.		
S8_15_1	L_D	31.48	48	29.13	-0.04896	-2.35		
	R	31.68	30	29.48	-0.07333	-2.2		
S8_17_2	L_D	32.91	26	28.36	-0.175	-4.55		
	R	32.31	20	27.13	-0.259	-5.18		
S8_19_3	L_D	33.24	18	32.68	-0.03111	-0.56		
	R	31.87	18	31.79	-0.00444	-0.08		
S8_21_4	L_D	26.44	28	31.05	0.164643	4.61		
	R	21.78	28	30.14	0.298571	8.36		
S8_23_5	L_D	31.39	15	30.42	-0.06467	-0.97		
	R	30.57	15	29.61	-0.064	-0.96		
S8_25_6	L_D	28.15	18	28.31	0.008889	0.16		
	R	27.17	8	29.48	0.28875	2.31		
S8_27_7	L_D	30.45	64	29.86	-0.00922	-0.59		
	R	22.07	0	22.07	xxx	0		
	mean	29.39357	24	29.25071	0.002394	-0.14286		
	std. dev.	3.769113	16.09109	2.510928	0.161881	-1.25818		
PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2	PHASE 2
sb_dy_gl	hand	time	temp.	duration	time const	time @ 5	endurance	endur. ext
S8_15_1	L_D	128	7.84	80	53.71	142	133	-9
	R	82	7.95	52	36.45	97	133	36
S8_17_2	L_D	175	5.17	149	73.09	142	174	32
	R	69	8.81	49	38.53	85	174	89
S8_19_3	L_D	142	5.03	124	52.28	118	142	24
	R	95	6.69	77	42.73	99	142	43
S8_21_4	L_D	130	6.81	102	56.46	135	173	38
	R	111	7.79	83	55.64	131	173	42
S8_23_5	L_D	69	9.18	54	38.87	85	117	32
	R	65	8.87	50	36.03	79	117	38
S8_25_6	L_D	104	5.01	86	40.86	86	104	18
	R	103	7.32	95	50.23	93	104	11
S8_27_7	L_D	176	7.92	112	73.18	187	183	-4
	R	42	10.44	42	52.05	77	183	106
	mean	106.5	7.487857	82.5	50.00786	111.1429	146.5714	35.42857
	std. dev.	40.44322	1.629772	31.8186	12.20912	32.2773	29.53411	31.06746
PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3	PHASE 3
SUB_DAY	S8_15_1		S8_17_2		S8_19_3		S8_21_4	
HAND	L_D	R	L_D	R	L_D	R	L_D	R
final time		91		77		108	147	120
final temp		17.19		15.53		11.05	7.56	8.87
delta		9.24		6.72		4.36	0.75	1.08
final time		126		144		141	173	141
final temp		7.87		6.21		5.48	6.1	7.91
delta		-9.32		-9.32		-5.57	-1.46	-0.96

Table B.16 Data for Subject 8 in the cold-wet condition.

final time		132		154			150
final temp		8.11		6.75			8.57
delta		0.24		0.54			0.66
final time				174			167
final temp				5.63			7.44
delta				-1.12			-1.13
final time							172
final temp							7.76
delta							0.32
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
	S8_23_5		S8_25_6		S8_27_7		
	L_D	R	L_D	R	L_D	R	
final time	78	73			183	57	
final temp	10.69	9.99			8.6	21.59	
delta	1.51	1.12			0.68	11.15	
final time	117	116				173	
final temp	6.24	5.05				5.8	
delta	-4.45	-4.94				-15.79	
final time						182	
final temp						9.31	
delta						3.51	
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							
final time							
final temp							
delta							

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